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NAVMED P-5088

CONTENTS

Credits: All pictures are Official Navy Photographs unless otherwise indicated.

COVER: (Photo courtesy of Ingalls Shipbuilding.) The USS *David R. Ray* (DD-971), christened 13 September 1975, is named in honor of HM2 David Robert Ray, USN (1945-1969) who, in a final act of extraordinary heroism, sacrificed his life to save the life of a Marine on the field of battle in Vietnam. The *David R. Ray* is the ninth ship to be christened in a 30-ship series of *Spruance* (DD-963) class multimission destroyers being built for the Navy by Ingalls Shipbuilding division of Litton Industries. For a report of the christening ceremonies, see page 13.

The continued support of the Media Division, Educational Programs Development Dept., Health Sciences Education & Training Command (HSETC), NNMC, Bethesda, Md., is gratefully acknowledged.

CORRESPONDENCE AND CONTRIBUTIONS from the field are welcomed and will be published as space permits, subject to editing and possible abridgment. All material should be submitted to the Editor, *U.S. NAVY MEDICINE*, Code 0010, Bureau of Medicine and Surgery, Washington, D.C. 20372.

NOTICES should be received not later than the third day of the month preceding the desired month of publication.

from the Chief

On his tour of a naval medical facility, VADM Custis (center) pauses to discuss a patient's status.

Last April, in a letter to the commanding officers of our medical centers and hospitals, I discussed recent developments regarding the length of stay (LOS) of active duty personnel in our medical facilities. At that time I requested your assistance in reducing the overall average length of patient stay to 15 days. For most activities this meant at least a 25% reduction. I also requested that medical centers and hospitals develop and submit plans of action indicating efforts being taken to reduce the LOS for active duty personnel.

The response has indeed been gratifying.

As anticipated, the proper use of medical holding companies is having a significant impact on reducing LOS at all activities. Many new holding companies have been established, others are being better utilized in consonance with recently issued directives. In some activities, such as Yokosuka and Bremerton, holding companies are used for alcohol rehabilitation patients—the patients are discharged to a holding company shortly after admission and detoxification, and then rehabilitated as outpatients.

Medical care evaluation programs are also being used to reduce LOS. NRMC Charleston, along with others, plans to establish norms for LOS by diagnosis. These norms will be used by the medical staff as part of the medical audit procedure reviewing utilization rates based on recommended average time-frame per diagnosis.

Other LOS innovations are being reported. For example: some activities, such as Naval Hospital Quantico and NRMC Jacksonville, are briefing newly arrived medical officers on LOS as part of the initial indoctrination; other commands at staff meetings are stressing early identification and disposition of patients who can be removed from the acute care setting by such methods as convalescent leave, subsisting out, medical holding companies, limited duty, referral to Physical Evaluation Boards, and transfer to Veterans Administration hospitals. NRMC Great Lakes prepares weekly printouts of patients who have been on the sick list longer than 15 days for review by the director of clinical services and service chiefs. Many hospitals describe improved administrative procedures, word processing, paper work management, and records maintenance and control. NRMC San Diego has instituted a policy whereby active duty patients are discharged on the same day if their narrative summary is dictated between 0800 and 1500. Admission procedures at NRMC Bremerton are being improved by screening all active duty admissions on Fridays to exclude elective surgery, medical workups, etc. Only clinically required admissions are permitted on Friday. Also, an ambulatory surgical service enables patients to be admitted to the operating room for minor surgery and discharged the same day.

Command efforts to date are most encouraging, and several activities have already reached their goal. As you continue to explore all avenues of improvement, we in the Bureau will welcome each additional idea for obtaining the LOS objective without compromising the quality of health care services we provide. We will soon be sending you a compendium of your collected input.

Keep up the good work. LOS accountability is highly visible and vital to us now.

New Hygienic Measures for Reduction of Mercury Vapor in Dental Operatories

CDR C.A. Lowe, DC, USN
CDR Sam Barboo, MSC, USN

At room temperature, elemental mercury exhibits the curious physicochemical property of changing from a liquid metal to a vapor. Vapor formation is influenced by temperature, metal surface area, and the quantity of mercury present. For purposes of quantitative analysis, mercury vapor behaves as a gas, not an aerosol.

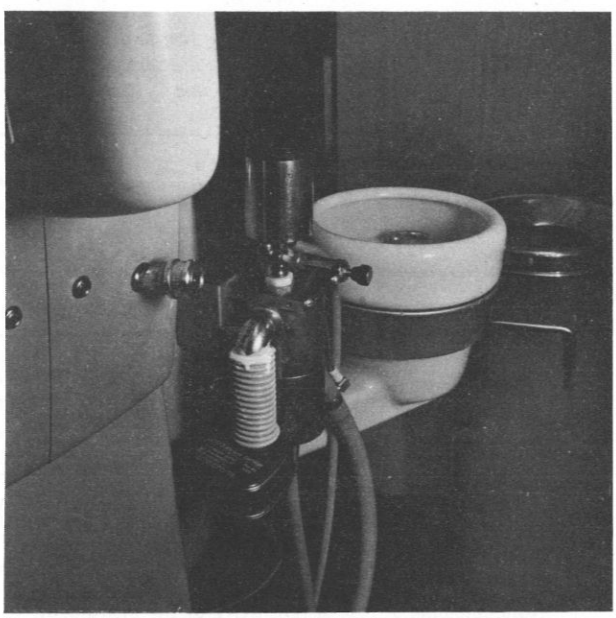
Recent studies (*1-19*) have described the health hazard that mercury vapor may pose for dentists and dental technicians who handle mercury during dental amalgam preparation. Mercury vapor usually enters the body through inhalation, and subsequently enters the blood stream through the alveolar-capillary wall. Percutaneous absorption is a secondary route of entry into the blood stream.

The threshold limit value for inorganic mercury is 0.05 milligrams (50 micrograms) per cubic meter of air (time-weighted average for an 8-hour workday). Threshold limit values refer to airborne concentrations of substances, and represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. The threshold limit value includes a safety factor, and is based on several studies of the relation between air concentrations of mercury vapor and the incidence of chronic mercury poisoning.

Recommendations for mercury control in dental operatories emphasize improved housekeeping methods to prevent evolution of mercury vapor. Decontamination of spilled mercury is advisable, since minute quantities of metallic mercury will sequester in porous substances and continually evolve.

CURRENT STUDY

In September 1973, industrial hygienists at the Navy Environmental Health Center, Cincinnati, Ohio, conducted a mercury survey of the dental facilities at Naval Regional Dental Center, Norfolk, Virginia. The survey concluded that the average air concentration of mercury in the dental operatories warranted a vigorous program of mer-



A mercury vapor filter (MSA Mersorb Cartridge) was installed on the AVS evacuation system.

CDR Lowe is the endodontics officer at the Branch Dental Facility, Naval Regional Dental Center, Norfolk Naval Shipyard, Portsmouth, Virginia 23709.

CDR Barboo is the Industrial Hygiene Officer, Naval Regional Medical Center, Portsmouth, Virginia 23709.

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cury control, as well as a continuing education program for the hygienic handling of mercury. Both programs are now in effect.

Later, during a routine survey at the branch dental clinic at Norfolk Naval Shipyard, a high concentration of mercury vapor was recorded near the outlet vent of the high velocity evacuation apparatus. Our study was undertaken to determine the amount of the mercury vapor generated by the evacuation system.

METHODS AND RESULTS

Mercury vapor concentrations can be collected by an impinger and fritted bubbler, and analyzed photometrically. This method is highly accurate, especially for studying the correlation between blood and airborne levels of mercury. We used a Harold Kruger (Model 24) mercury vapor meter which permits direct readings on site and is especially suited for a regional traverse of varying mercury concentrations. Previous studies in which breathing zone samples were obtained with impingers had not identified the evacuation vent as a source of mercury vapor generation.

We measured airborne mercury vapor at the evacuation exhaust, the amalgam preparation cabinet, and the floor of seven dental operatories. Our survey of the floor and amalgam preparation areas identified mercury vapor concentration relative to the extent of amalgam preparation in the operatory, and gave an indication of the quality of the precautions being used.

On 11 May 1974, a mercury vapor filter (MSA Mersorb Cartridge Part Number 76886, manufactured by the Mine Safety Appliances Company, Pittsburgh, Pennsylvania) was installed on the evacuation outlet in dental operatory 204. The filter absorbed mercury vapors to a nondetectable limit based on the instrument lower limit. Subsequent sampling to determine the performance life of the filter yielded these results:

DATE	MERCURY VAPOR READING
11 May 1974 (installation)	0.0 mg/M^3
3 June 1974	0.0 mg/M^3
18 September 1974	0.0 mg/M^3
7 November 1974	0.005 mg/M^3

The mercury vapor filter apparently is effective for about six months.

Filters were installed in five more dental operatories at the clinic. As expected, we continued to detect mercury levels after the filters were installed; these levels were attributed to other previously recognized sources of mercury dispersion. Breathing zone samples were measured at 0.01 mg/M^3 for the dental technician, and 0.005 mg/M^3 for the dentist.

TABLE 1. Mercury Vapor Concentrations By Sampling Location

Operatory	Time and Date	Floor	Amalgam Preparation Cabinet	Evacuation Exhaust
Examining Room 201	1035 3 Jun 74	N.D.*	N.D.	0.086 mg/M^3
Operatory Room 202	1045 3 Jun 74	N.D.	N.D.	0.03 mg/M^3 0.05 mg/M^3**
Prophylaxis Room 203	1055 3 Jun 74	N.D.	0.005 mg/M^3	0.018 mg/M^3
Operatory Room 204	1030 3 Jun 74	0.001 mg/M^3	0.01 mg/M^3	N.D.†
Operatory Room 205	1107 3 Jun 74	N.D.	N.D.	0.02 mg/M^3
Operatory Room 207 (Not in use)	1120 3 Jun 74	0.01 mg/M^3	0.005 mg/M^3	0.01 mg/M^3
Endodontics Room 215	1130 3 Jun 74	0.01 mg/M^3	0.012 mg/M^3	0.01 mg/M^3

*Nondetectable at lowest sensitivity of the instrument.
**When fresh scrap amalgam pulled through.
†Mercury vapor filter installed since 11 May 1974.

RECOMMENDATIONS

The wide variation in concentrations of mercury vapor found in dental operatories is assumed to be related to the volume of amalgam used (Table 1), the amount of scrap surplus, and the quality of hygienic housekeeping and spill control efforts. Based on our study, we recommend that Navy dental facilities use a filter system at the outlet of all high-velocity evacuation apparatus. Manufacturers should develop a filter system for use with present and projected evacuation equipment. Use of an iodine-impregnated, activated charcoal filter will help reduce airborne mercury vapor generated by the high-velocity evacuation apparatus.

To decontaminate and store scrap amalgam, we recommend use of a commercially available solution known as HgX, or "mercury X." HgX is an odor-free, water-soluble calcium sulfide powder combined with a chealating component and a dispersing agent. In our study we found transitory (i.e., upon removal of scrap container covers) mercury vapor readings ranging from 0.06 to 0.08 milligrams per cubic meter when water was used to cover amalgam scrap; but no discernible mercury vapor levels were measured when the amalgam scrap was immersed in an HgX solution one inch above the surface of the amalgam.

The following recommendations are also offered to help ensure good mercury control in Navy dental facilities:

- Dentists and dental auxiliaries should receive formal training in the occupational hazards of mercury, and proper methods of mercury control.
- Bulk mercury should be maintained in storerooms in unbreakable, tightly sealed containers.
- Decks and cabinet drawers in dental operatories should be regularly monitored by mercury vapor detectors, and thoroughly vacuumed with specially filtered vacuum cleaners.
- Air conditioner and heating filters should be checked with a mercury vapor detector. Filters should be changed or cleaned periodically.
- Stainless steel containers and trays are preferred when calcium sulfide (HgX) solution is used, to avoid discoloration (sulfide oxidation).
- Work practices should ensure that minimal spillage occurs, and that such spillage is limited to a contained area. Stainless steel trays (16" x 14" x 2") are best suited to hold amalgam supplies. This includes the triturator, a 4-inch covered stainless steel container for amalgam scrap (with 1 inch of HgX), screw-top amalgam capsules, and 4" x 4" polyethylene bags (FSN 8105-837-7553) to hold used squeeze cloths.
- Dental personnel should realize that amalgam preparation can be hazardous if the mercury is not contained in screw-top capsules or commercial, pre-measured alloy-mercury capsules which will limit spillage.

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The Compazine Hangover

LCDR J.B. Lorenzo, MC, USNR
LTJG E.A. Nisonger, MSC, USNR
Naval Hospital Corpus Christi, Texas 78419

With the shortage of flight surgeons, other medical specialists may find themselves caring for members of the aviation community. The unique occupational stresses of flying require special consideration, and new demands may be made on the physician's diagnostic skills.

Consider the following case of a young pilot for whom the side effects of therapeutic Compazine were potentially more hazardous than his original illness.

CASE REPORT

A 26-year-old Navy aviator reported to the dispensary for treatment of gastroenteritis, with symptoms of nausea and vomiting. He was given Compazine suppositories. The pilot's symptoms were relieved after taking only three suppositories, and he stopped the medication.

The next morning, feeling much better, the pilot attended an all-officers' meeting. While there he felt restless, as though he couldn't keep still. After the meeting these symptoms subsided, and he reported to the flight surgeon for a flight clearance notice (NAVMED 1381).

While conferring with the flight surgeon, the aviator, almost in passing, mentioned that he was experiencing mild queasiness, symptoms he thought were part of the disease process. The flight surgeon rightly postponed issuing the clearance until further evaluation could be conducted.

Later that evening, the pilot experienced a tightening sensation in his jaw, with involuntary side-to-side jaw movements. He was referred by his flight surgeon to the naval hospital for treatment.

The emergency room physician at the hospital noted that the patient's condition resembled lockjaw: jaw movements were involuntary, the jaw shifting spasmodically from one side to the other with wormlike movements and protrusion of the tongue.

Suspecting possible drug-induced side effects, the physician asked the pilot if he had received medications for any recent illness. The pilot mentioned the Compazine suppositories he had taken for suppression of gastroenteritis. The physician then consulted the *Physician's Desk Reference* and found that Compazine did indeed produce side effects identical to those experienced by the pilot. Appropriate X-rays of the jaw were taken to detect possible temporomandibular joint dislocation; these were normal, as were tests for electrolytes and calcium. Deciding that the dyskinetic movements were a delayed side effect of the Compazine, the physician relieved the symptoms through administration of intramuscular phenobarbital.

RECOMMENDATIONS

Because of their bizarre, long-lasting side effects, the Compazine family of drugs and other phenothiazines should be dispensed parsimoniously to the aviation community. While taking any medications, flight crewmembers should be extremely honest about unusual or lingering side effects or symptoms. The side effects of some drugs can last hours, or even days.

Physicians should be aware of all possible side effects of the drugs they dispense. When members of the aviation community are involved, appropriate grounding time should be observed and consultation with a flight surgeon or flight surgeon designate should be obtained before a clearance notice is granted.

OPNAV Instruction 3710.7 series requires that "flight surgeons shall indicate necessary flight limitation on all prescriptions provided to flying personnel," and warns that "almost any drug or 'pill' can at times produce untoward reactions or impair the coordination and concentration required in flight."

The Spectral Apexcardiogram

A New Approach to the Quantitation of Precordial Vibrations

ENS Felipe C. Robinson, USNR

INTRODUCTION

Apexcardiography is a noninvasive, graphic technique of considerable value in assessing various types of heart disease (*1-10*). The apexcardiogram is an analog recording of the low frequency vibrations over the left precordium generated by left ventricular contractions. Evaluation of left ventricular function by noninvasive techniques is desirable because conventional hemodynamic, fluoroscopic, and angiographic methods are too time-consuming, hazardous, and expensive for routine screening or serial clinical studies (*11-15*).

Since the apexcardiogram was first described by Cheauveau and Marey (*16*) in 1861, many investigators have advanced the technique and described new applications (*17-21*). But correlation and comparison of apexcardiographic recordings has been difficult because of the wide variety of transducer designs (*22,23*). In addition, application of the apexcardiogram to serial studies of patients with known cardiomyopathies and valvular disease has been hampered by the absence of an acceptable method of quantitating and standardizing the technique (*24-26*).

The aims of this study were to compare spectral characteristics of apexcardiograms recorded with two transducers of different designs, to define the Fourier power spectrum of the normal apexcardiogram, and to define the apexcardiogram of the patient with mitral insufficiency.

The technique used in this study allows the description of the apexcardiogram by its frequency signature, thereby allowing quantitation of apexcardiograms by measurement of frequency content. The fidelity of reproduction of different transducers was compared by recording sequentially on the same patient. The frequency content difference between normals and patients with mitral insufficiency was obtained by averaging the frequency content of apexcardiograms recorded on mitral insufficiency patients and volunteers with no known cardiac disease.

METHODS AND EQUIPMENT

Apexcardiograms were obtained on 55 subjects: 39 males and 16 females, with an age range of 18 to 69 years, of whom 37 subjects were normals (no known previously diagnosed heart

ENS Robinson is a medical student at the University of Florida in Gainesville. His address is: Box 619 MSB, University of Florida, J. Hillis Miller Health Center, Gainesville, Florida 32610.

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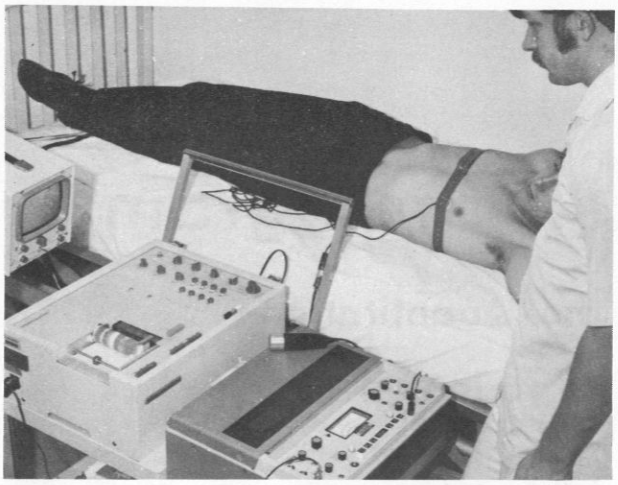

FIGURE 1. The apexcardiogram was simultaneously recorded through use of the Mingograf-34 and the Hewlett-Packard 3960 magnetic tape recorder.

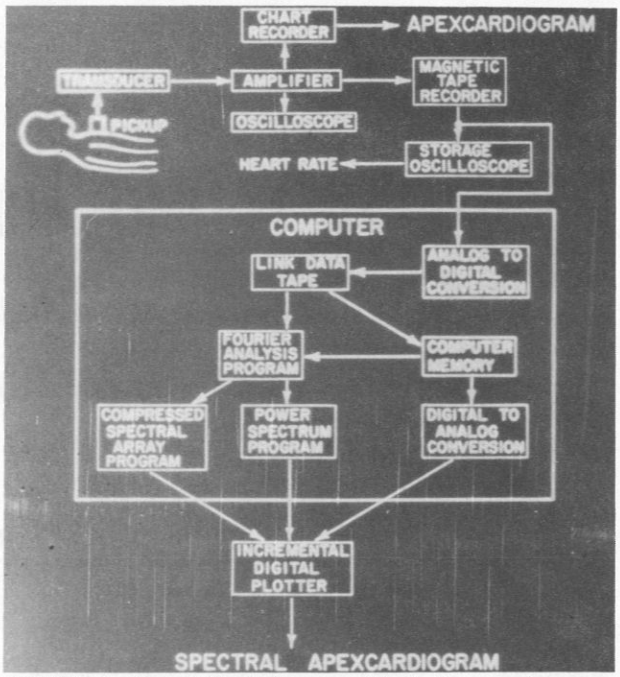

FIGURE 2. Overall block diagram of technique used to generate spectral apexcardiogram.

disease), and 18 subjects had previously diagnosed mitral insufficiency. For the transducer study, 47 subjects were randomly selected, of whom 37 were normals and 10 had mitral insufficiency.

Apexcardiograms were recorded by employing two commercially available transducers, one direct contact and the other air coupled. The transducers were the Sanborn APT-16 (Sanborn Division, Hewlett-Packard Company, Inc., Waltham, Massachusetts) and the EMT 510-C (Elema-Schonander Corporation, Stockholm, Sweden). The Sanborn APT-16 is a direct contact differential inductance transformer with an infinite time constant, and flat phase and frequency response characteristic from 0.1 Hz to 65 Hz. The Elema-Schonander 510-C is a pneumatically driven, linear piezoelectric transducer with a time constant of 1.2 seconds, and flat phase and frequency response characteristics from 0.1 Hz to 50 Hz. Sequential apexcardiographic recordings were obtained from all subjects using the APT-16 and the EMT 510-C. The EMT 510-C was connected to a Hewlett-Packard C13 microphone, which is shaped like a stethoscope bell. The transducer outputs were fed into an Elema-Schonander Mingograf-34 amplifier/recorder. The output of the Mingograf-34 was applied to a Tektronics 564 storage oscilloscope and simultaneously recorded on a Hewlett-Packard 3960 magnetic tape recorder (Figure 1). The recorded tapes were then used to input the data into a PDP-12 (Digital Corporation, Boston, Massachusetts). The PDP-12 computer

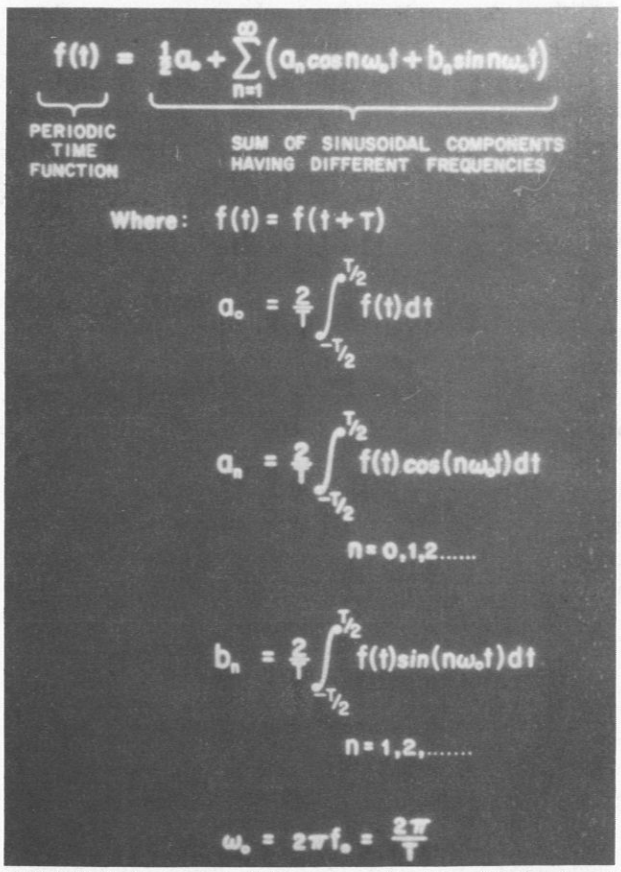

FIGURE 3. Statement of Fourier's postulate and definition of coefficients.

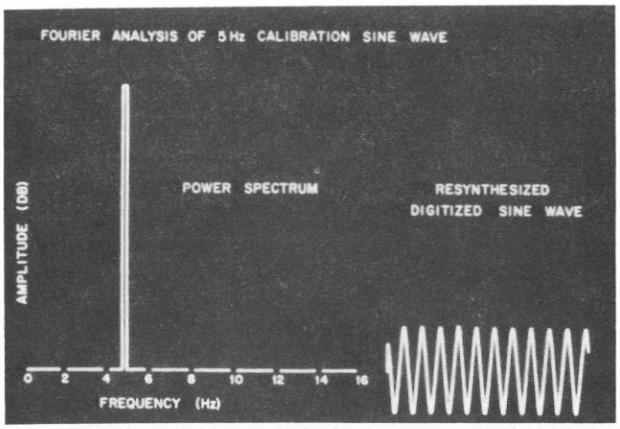

FIGURE 4. The power spectrum of a pure sinusoid converges to a single frequency component corresponding to the number in Hertz (cycles per second) of the oscillations.

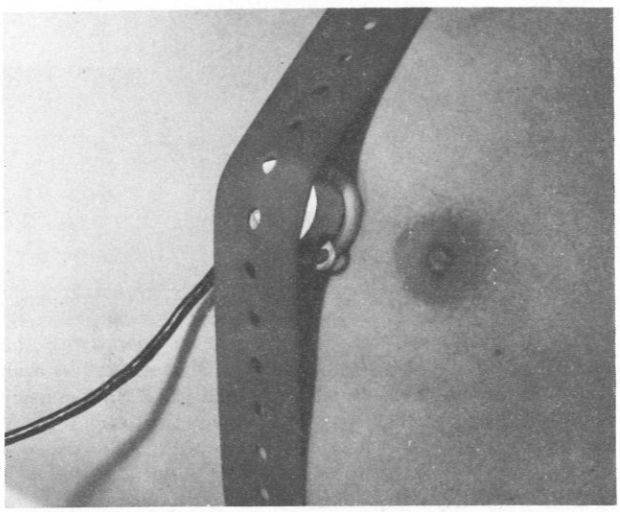

FIGURE 5. The APT-16 transducer is secured over the left ventricular apex.

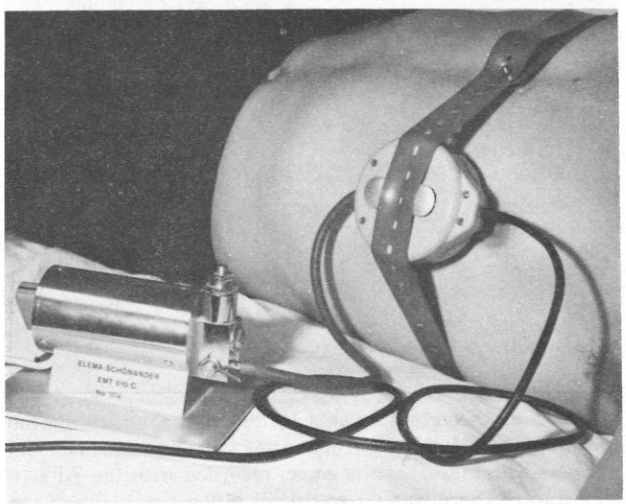

FIGURE 6. The EMT 510-C transducer is connected to a Hewlett-Packard C-13 microphone pickup in position over the left ventricular apex.

TABLE 1. Comparison of Heart Rate in Beats Per Second and Fundamental Frequency in 47 Subjects†

	*HR (beats/sec)	$FF_{510\text{-}C}$ (Hz)	$FF_{APT\text{-}16}$ (Hz)
MEAN	1.2253	1.2234	1.2180
STANDARD DEVIATION	0.1991	0.2100	0.2249
EXTREME VALUES	0.79-1.65	0.75-1.75	0.75-1.75
STANDARDIZED VARIABLE	0.8898	0.8894	0.8884

†37 normals and 10 subjects with mitral insufficiency. This data establishes that the heart rate of the subjects is the source of the fundamental or dominant frequency in the power spectrum.

*HR x 60 = Heart rate in beats/min.

digitized the apexcardiograms and used the data to generate discrete power spectra with the aid of the Fourier analysis program. An overall block diagram of this technique is shown in Figure 2.

The "spectral apexcardiogram" is the name given to the power spectrum of the apexcardiogram with adjacent plot of the resynthesized analog apexcardiogram generated from the previously digitized data. Fourier's postulate, which states that a duality exists between time domain functions and frequency domain functions, is applied. Hence, any function [f(t)], which is periodic and in a given interval is single valued, finite, continuous, or having only a finite number of discontinuities, can be described by an infinite series in the frequency domain (*27*). A plot showing each of the harmonic amplitudes in a complex waveform is called a power spectrum. All apexcardiograms represent complex waveforms. The harmonic amplitudes decrease rapidly in waveforms with rapidly converging power series. Hence, the harmonic content and power spectrum of a waveform represent part of the very nature of the waveform and do not change unless the waveform is altered (Figures 3 and 4).

The apexcardiograms were performed on every subject in the left lateral decubitus position. The site of maximal left ventricular impulse was identified by palpation and the pickup device of each transducer was secured over that point on the left precordium by a circumferential one-inch elastic strap (Figures 5 and 6). Recordings were obtained in each subject during held expiration for 15 to 20 seconds. Accurate technical quality of each apexcardiogram was ensured prior to its

recording by displaying the waveform on the oscilloscope together with the electrocardiogram.

RESULTS

The heart rate (HR) range in the 47 subjects was 48 to 99 beats per minute, which corresponds to 0.79 to 1.65 beats per second; the mean HR was 73 beats per minute, which is equivalent to 1.225 beats per second. There was no significant difference in the mean fundamental frequency (FF) between the two transducers (Table 1). The mean FF for the 510-C was 1.223 Hz (S.D. = 0.210) compared to the APT-16 with 1.218 Hz (S.D. = 0.223). Typical power spectra and computer-generated apexcardiograms are shown in Figure 7.

There was a high degree of correlation ($p < 0.01$) between the HR and FF of the power spectrum (Table 1). The correlation coefficient (r) was determined for the paired observations of HR vs FF 510-C and HR vs FF APT-16 and revealed 0.942 and 0.915 respectively. The correlation coefficient for FF 510-C vs FF APT-16 was 0.838 (Table 2).

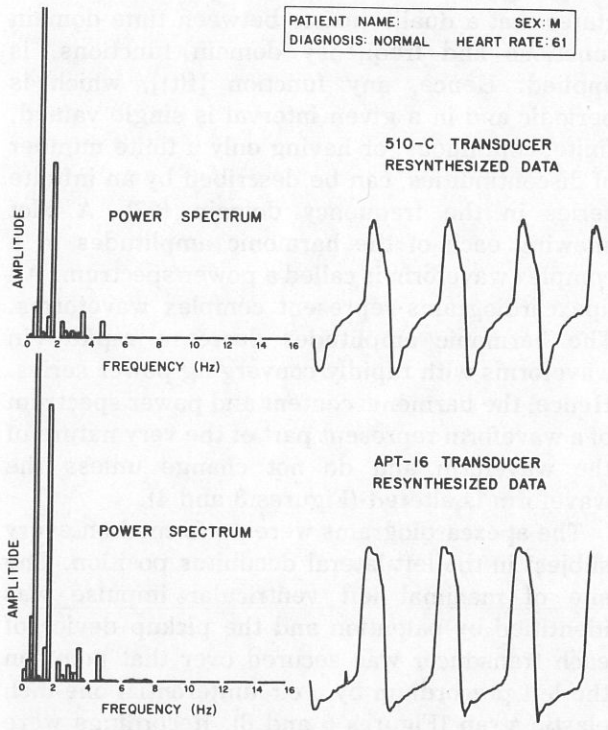

FIGURE 7. Spectral apexcardiograms (power spectra and adjacent plot of computer resynthesized apexcardiograms) on a subject employing the EMT 510-C transducer (upper part of figure) and the APT-16 transducer (lower part of figure).

TABLE 2. Comparison of Pearson Product-Moment Linear Correlation Coefficient, Slope of Regression Line and Y-Intercept for the Paired Observations of HR vs FF and FF 510 vs FF APT-16 on the 37 Normal Subjects.*

	(HR) vs. (FF_{510-C})	(HR) vs. (FF_{510-C})	(FF_{510-C}) vs. (FF_{APT-16})
CORRELATION COEFFICIENT	0.9421	0.9150	0.8380
SLOPE OF REGRESSION LINE	0.9609	1.0334	0.8169
Y-INTERCEPT	0.0459	-0.0481	0.2148

*This data establishes that the two transducers are accurately recording the apexcardiogram in the frequency range centered at the fundamental frequency and that there is a strong and statistically significant correlation between the HR and FF.

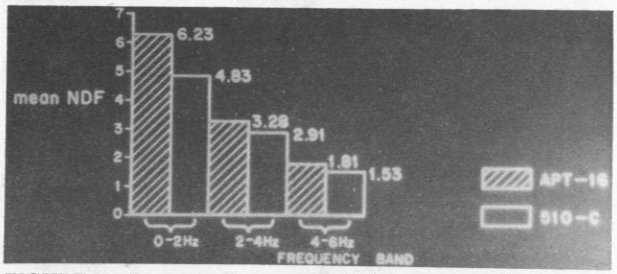

FIGURE 8. Discrete frequency histogram identifying the mean number of discrete frequencies (NDF) recorded by each transducer in the 0 to 2 Hz, 2 to 4 Hz, and 4 to 6 Hz frequency bands. The frequency components recorded between 0 and 6 Hz accounted for 99.2% of the total NDF. There was a statistically significant difference (< .01) in the recording of 0 to 2 Hz frequency components.

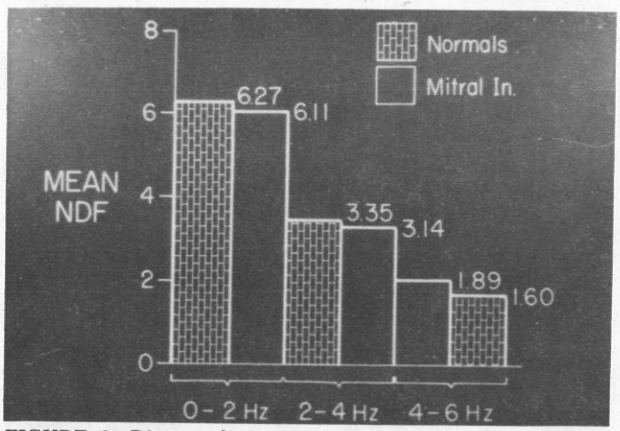

FIGURE 9. Discrete frequency histogram demonstrating the mean number of discrete frequencies (NDF) for normals and subjects with mitral insufficiency, recorded with the APT-16 transducer. There was no statistical difference between the NDF recorded in either group in the 0 to 2 Hz, 2 to 4 Hz, and 4 to 6 Hz frequency bands. There was no statistical difference in total NDF.

Neither transducer recorded any frequency component above 12 Hz, and less than 1% of the total power spectrum distributed over the transducer's band width was detectable in frequencies exceeding 8 Hz. The mean number of discrete frequencies (NDF) for each 2-Hz frequency grouping was identified for each transducer (Figure 8).

As depicted in Figure 9 most of the low frequency vibrations are recorded in the 0 to 2 Hz range. The calculated "t" value for this study is 3.26, which exceeds the critical value and demonstrates that at the 1% level of significance the APT-16 transducer is more effective than the EMT 510-C for recording 0 to 2 Hz frequency components. The differences in total number of discrete frequencies (TNDF), NDF at 2 to 4 Hz, NDF at 4 to 6 Hz, and the number of frequency components above 6 Hz which were detected by the two transducers were not statistically significant.

The HR range in 18 patients with mitral insufficiency was 48 to 86 beats per minute, which corresponds to 0.79 to 1.44 beats per second; the mean HR was 68 beats per minute, the equivalent of 1.13 beats per second (Table 3). Again, there was a strong correlation between the HR in beats per second and the FF of the power spectrum (Table 4). The correlation coefficient (r) was determined for the paired observations of HR vs FF 510-C and HR vs FF APT-16 and revealed 0.939 and 0.842 respectively. The correlation coefficient for FF 510-C vs FF APT-16 was 0.773.

TABLE 3. Comparison of Heart Rate to Fundamental Frequency in 18 Subjects with Previously Diagnosed Mitral Insufficiency

	HR (beats/sec)	FF_{510-C} (Hz)	FF_{APT-16} (Hz)
MEAN	1.132	1.140	1.144
STANDARD DEVIATION	0.2225	0.2297	0.2582
EXTREME VALUES	0.79 - 1.44	0.75 - 1.50	0.75 - 1.50

TABLE 4. Linear Regression (Correlation) Analysis of Heart Rate and Fundamental Frequency for the 18 Subjects with Mitral Insufficiency

	(HR) vs. (FF_{510-C})	(HR) vs. (FF_{APT-16})	(FF_{510-C} vs. FF_{APT-16})
CORRELATION COEFFICIENT	0.9393	0.8424	0.7727
SLOPE OF REGRESSION LINE	0.8684	0.9777	0.8640
Y-INTERCEPT	0.1886	0.0405	0.1579

DISCUSSION

The design differences of these two transducers must be considered when evaluating and comparing their performance (*32*). The direct contact transducer (Hewlett-Packard APT-16) has a sensing element with a 0.625 cm diameter plunger which maintains contact with the subject's chest wall. This transducer generates an analog voltage proportional to the displacement of the plunger. The air-coupled transducer (Elema-Schonander EMT 510-C) is connected to a separate pick-up device which is shaped like a stethoscope bell. The precordial impulse is thereby coupled pneumatically to the transducer via a 25 cm rubber tubing with an internal diameter of 0.55 cm. The pick-up device used with the 510-C transducer has a contact area with a ratio greater than 31 to 1 compared to the plunger of the APT-16. For that reason, the positioning of the APT-16 is more critical than the pick-up bell of the 510-C.

The electronic design of the two transducers is considerably different (*23*). The APT-16 is a linear variable differential transformer (Figure 10), a low impedance device with good high-speed tracking and relative insensitivity to temperature and humidity. The 510-C is a piezoelectric linear displacement transducer, a high-impedance device which delivers very small currents and does not tolerate a resistive load. Because of leakage resistance, the output voltage across the piezoelectric transducer cannot be maintained when a sustained force is applied (Figure 11). This contributes to significant limitations of the time constant and low frequency capabilities of this type device. Temperature changes and humidity fluctuations may also adversely affect the performance of a piezoelectric linear displacement transformer.

The differences in fidelity and design characteristics of transducers are important considerations when clinical studies are performed. In many of the clinical investigations in which abnormal apexcardiograms were reported in various types of heart disease, the observations were made with piezoelectric transducers (*18,28,29*). Apexcardiographic changes from "normal" may in fact result from waveform distortion introduced by the limitations of the piezoelectric transducers or air

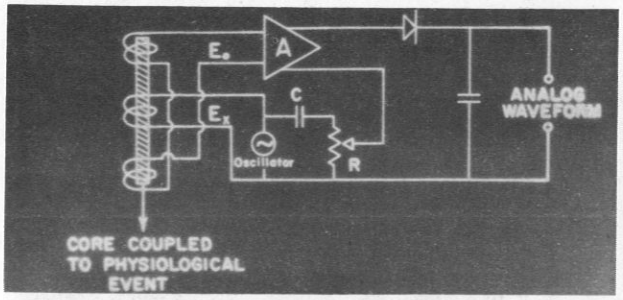

FIGURE 10. Equivalent circuit for linear variable differential transformer (LVDT) similar to APT-16.

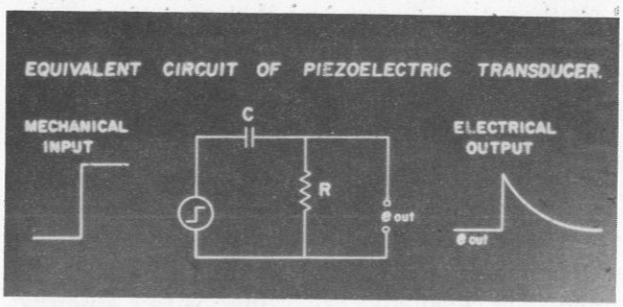

FIGURE 11. Equivalent circuit for linear piezoelectric transducer similar to EMT 510-C.

leaks in the system (*30*). Johnson and associates (*31*) observed significant alterations in the waveform in systole, in the "0" point, and in the rapid filling wave from recordings made by transducers with inadequate time constants.

The power spectra of the apexcardiograms recorded on subjects with mitral insufficiency did not demonstrate a statistically significant difference from those recorded on normals. Hence, at this point it appears that the power spectra per se are not sufficient for differentiation between normals and abnormals. However, this technique does lend itself to documentation and quantitation of serial apexcardiograms on a given patient. Application of this technique to large groups of normals and patients with heart disease will be necessary to determine whether Fourier analysis will differentiate normals from abnormals.

SUMMARY

In summary, it may be concluded that the APT-16 transducer was more effective than the 510-C at recording low frequency vibrations in the 0 to 2 Hz range, the most critical frequency range for accurate reproduction of the apexcardiogram. Greater than 99% of the detected frequencies were in the 0 to 8 Hz range. This study has demonstrated that Fourier analysis offers a reliable tool for the comparison of apexcardiographic transducer capability and a promising new technique for the monitoring and quantitation of normal and abnormal precordial motion.

Acknowledgement:

My thanks to CAPT A.D. Hagan, MC, USN, chief of the cardiology service, NRMC San Diego, for advice and guidance during all stages of this investigation.

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DESTROYER NAMED FOR HM2 DAVID RAY

Hospital corpsmen have distinguished themselves in every war and foreign expedition in which the United States has been involved, RADM E.J. Rupnik (MC) said on 13 September 1975 at the christening of the USS *David R. Ray* (DD-971). The ship was named for HM2 David Ray, who died in Vietnam at the age of 24 while treating wounded Marines. HM2 Ray was awarded the Medal of Honor posthumously for his actions.

"David R. Ray is an example of the courage and devotion to duty in the individuals we train to administer health care to the operational forces," RADM Rupnik said. "The use of paramedical personnel to deliver primary health care has been so successful in the military, and in particular the Navy, that the civilian medical community has come to realize the value of these outstanding individuals in developing their own physician's assistant programs."

RADM Rupnik noted that HM2 Ray volunteered for duty with the Fleet Marine Force in Vietnam because he felt that he was not doing enough for his country. Near the end of his first tour he asked for an extension. During an enemy attack on 19 March 1969, HM2 Ray was wounded while treating injured Marines. He continued to provide care and, while defending his patients against the attacking enemy, was mortally wounded. In a final valiant heroic effort, he threw his own body on a wounded Marine, protecting him from an exploding grenade.

"The naming of the DD-971 for David Ray is a tribute not only to him, but to all corpsmen who have given their lives in the defense of their country," RADM Rupnik said.

The destroyer was christened by HM2 Ray's mother, Mrs. Donnie M. Ray, of McMinnville, Tennessee. A close friend, Mrs. Ernest Smallman, Jr., also of McMinnville, served as matron of honor.

The USS *David R. Ray* is the ninth ship in a series of advanced, high-performance destroyers being built for the Navy by Ingalls Shipbuilding division of Litton Industries.

HM2 David R. Ray
1945-1969

NAVMED Newsmakers

GERALDINE: Partying

There's never been a Navy nurse quite like **Geraldine**. But there she was in the White House, at a birthday party for President Ford. Comedian **Flip Wilson**'s skit was the highlight of the event, which was sponsored by the White House Medical Unit.

Tennis whiz LT **Traylor Rucker**, a Navy nurse attached to the Naval Aerospace and Regional Medical Center, Pensacola, Florida, is wearing three new medals since the end of the All-Navy Women's Tennis Competition this summer. She placed first in the East Coast Women's Singles, and second in the All-Navy Women's Singles. With her partner, RM3 Linda Moore, she placed second in doubles.

The Surgeon General's Award for academic excellence was presented to LCDR **James H. Kerr** (MC) during graduation ceremonies at the Naval Aerospace Medical Institute, Pensacola, Florida. Nine flight surgeons and two aerospace physiologists completed training. In other Institute ceremonies, 23 students graduated as aerospace medicine technicians, and two as aerospace physiology technicians.

Off-duty life saving is getting to be a habit with HM1 **Dale A. Saurers**. In July he was on hand when 2-year-old Jennifer Fries was pulled unconscious from a wading pool in the Middletown, Rhode Island, Navy family housing area. The corpsman applied mouth-to-mouth resuscitation and cardiac massage alternately for several minutes until the youngster was breathing again. This was the second life-saving effort for HM1 Saurers. In October 1974 he helped rescue a man who had been badly beaten about the head and was in critical condition. Now stationed aboard the USS **Adroit**, HM1 Saurers has received the Navy Commendation Medal for his actions.

SAURERS & JENNIFER: Life saving

CAPT **Philip J. Boyne**, a retired Navy dental officer, has received the first Research Recognition Award offered by the American Society of Oral Surgeons Committee on Research. He was honored for his research efforts in bone physiology. Now dean of the University of Texas Dental School in San Antonio, CAPT Boyne trained in oral surgery at Naval Hospital Bethesda, Maryland, and later served as chairman of the Dental Research Department, National Naval Medical Center.

Equipped with the mysterious paraphernalia of his trade, the "**Medicine Man of the Mayoki Indian Tribe**" recently toured Naval Aerospace and Regional Medical Center, Pensacola, Florida, amusing patients and staff with his antics. His visit was part of the Fiesta of Five Flags, an annual event commemorating the area's colorful history. The Mayoki Indian Tribe is fictitious, but the Medicine Man seemed ready to meet needs that are real. "I'm responding to the call for more medical officers in the Navy," he told CAPT **Paul Gregg** (MC), director of clinical services.

MEDICINE MAN: Amusing

SCHOLARS' SCUTTLEBUTT

We need your help. The Navy will soon begin a drive to recruit 100 second- and third-year medical and osteopathic students for next year's Armed Forces Health Professions Scholarship (AFHPS) Program. You are our best representatives in the schools, and can assist us in our efforts. If you have classmates who are interested, ask them to contact the nearest Navy Recruiting District Office for an application. Further information may be obtained from Chief, Bureau of Medicine and Surgery, Code 314, Department of the Navy, Washington, D.C. 20372.

What are the advantages of joining the program? The immediate return is financial. With constantly escalating costs of medical education, many students are unable to meet all financial requirements from their own or their family's resources. The AFHPS Program, as you know, provides an income of over $5,000 a year, and also defrays the cost of tuition, fees, and required books. In many cases the total financial support amounts to well over $10,000 each year. Additionally, AFHPS students have the opportunity during the school year to participate in clerkships in some of the finest teaching programs in the country. Many students receive all or part of their graduate medical education in Navy programs.

While talking to your classmates about the program, try to sell them on the Navy. We want to attract that type of person who recognizes and enjoys a challenge. The career opportunities are limitless. In addition to clinical medicine, our health services system supports Navy ships at sea, air wings, Marine units, and major research units. The Navy Medical Department encourages and allows its officers to move from one challenging area of health care to another. We are thereby able to meet our requirements while affording the maximum in career satisfaction.

Tell your interested friends to contact their recruiting officers as soon as possible. Selections will be made early in February 1976. This date is a change from previous announcements you may have seen. By advancing the selection date, we hope to enable students to arrange the funding of their education sooner.

GRADUATE LEVEL ONE SELECTION

The letters are out. The Bureau of Medicine and Surgery has completed its selection to fill Graduate Level One positions in Navy training hospitals, beginning in 1976.

With more than 400 applications to evaluate, the selection process was not easy. Many factors were considered. We tried to match your interests, capabilities, enthusiasm, and performance—based on our knowledge of you from your clerkships and applications—with our needs. But there were not enough positions to accommodate all of the excellent candidates. As a result, many excellent applicants were not able to enter first-year Navy programs.

The breakdown of selections is as follows:

- TOTAL APPLICATIONS 430
- TOTAL SELECTED 192 (45%)

Order of Preference	*By Program*	*By Hospital*
First	172 (89%)	138 (72%)
Second	12 (6%)	30 (16%)
Third	6 (3%)	12 (6%)
Fourth	2 (1%)	11 (6%)
Seventh	1 (<1%)	1 (<1%)

Many of the unsuccessful candidates with whom members of the training office at BUMED have communicated have expressed concern that failure of selection will prejudice their chances of a naval career. This concern is invalid. As mentioned earlier, selection for the limited spaces was based on many factors and in many instances must reflect a limit on the number of training opportunities in the field of your choice. Reentry into a full continuum of training, either in a civilian deferred status or in the Navy's medical education system, following a tour of duty as a general medical officer will continue to be available. This year more than 50% of available second-year training positions were offered to officers assigned to fleet or other nontraining billets.

BUMED SITREP

LINE OF DUTY/MISCONDUCT DETERMINATIONS

The Office of Naval Disability Evaluation (ONDE) reports that some naval medical treatment facilities are not complying with the requirements of the joint ONDE/BUMED letter of 8 April 1975 ("Line of duty/misconduct determination in connection with physical disability separation"). It is not sufficient to send ONDE only the medical records of injury cases referred for evaluation. A copy of the line-of-duty investigation, the injury report, or a copy of all communications from the hospital trying to obtain these documents must also accompany the medical board report.

Copies of the joint ONDE/BUMED letter on this subject are available from BUMED Code 33.

SHIPSHAPE GROUPS SEEK MEDICAL CONSULTANTS

SHIPSHAPE, patterned on Overeaters Anonymous and Alcoholics Anonymous, provides group support for people who want to reduce and maintain their weight at acceptable levels. Medical officers interested in volunteering to serve as medical consultants to Navy SHIPSHAPE groups may obtain further information from BUMED Code 313. Or write: CAPT Joseph A. Pursch, MC, USN, Chief, Alcohol Rehabilitation Service, NRMC Long Beach, California 90801.

BLOOD BANKS TO RECEIVE FDA LICENSE

In accordance with a letter of agreement between the Navy and the Bureau of Biologics, Food and Drug Administration (FDA), the Navy has sought FDA license to manufacture blood and blood products under the Code of Federal Regulations, Title 21, Parts 600-1299.

The licensure program has been pursued in two phases. Phase I—inspection and licensure of the five area blood centers—is nearing completion. U.S. License No. 635 has been issued to the Surgeon General as responsible head for the manufacture of blood and blood components in the Navy. The first establishment to be licensed was NRMC San Diego. Licensure of the other four facilities will soon follow.

Phase II—inspection and licensure of 13 selected satellite Navy blood banks—has been implemented. Anticipated completion date for FDA licensure of these blood banks is 31 December 1975.

MILITARY CONSTRUCTION NURSE ADVISER NAMED

CDR Phyllis J. Elsass (NC) has been selected for a newly established position (Code 41-N) in BUMED's Facilities Division. As nurse adviser for military construction, she will provide nursing advice for medical construction projects, and will function as liaison between the planning personnel of the Facilities Division and Nurse Corps personnel in other Bureau codes and field activities.

OCCUPATIONAL AND PREVENTIVE MEDICINE DIVISION

The Preventive Medicine Division (BUMED Code 55) and the Occupational Environmental Health Division (Code 56) have been combined. New title: Occupational and Preventive Medicine Division, BUMED Code 55. Division director is CAPT C.E. Alexander (MC). Deputy director is CAPT G.M. Lawton (MC).

EMERGENCY TREATMENT OF ACUTE PESTICIDE POISONING

Medical Department personnel are encouraged to save and use the chart of emergency medical treatment for acute pesticide poisoning that appears in this issue of U.S. Navy Medicine (pp. 18-19). Full-size charts are available from: Disease Vector Ecology and Control Center, NAS Jacksonville, Florida 32212.

MEDICAL DISPOSITION AND PHYSICAL STANDARDS NOTES REVISED

The informational booklet, Medical Disposition and Physical Standards Notes, is being revised. No significant expansion of size or coverage is envisioned, but readers are invited to review the January 1975 issue to consider how it may be made more responsive to their needs, which parts are unclear or outdated, and what should be deleted or elaborated upon. Send comments to BUMED Code 3322.

REGISTRY OF ADVERSE OCCUPATIONAL HEALTH REACTIONS

A registry of occupationally related adverse health reactions has been established at the Navy Environmental Health Center, Cincinnati, Ohio. Medical Department personnel are requested to submit reports of any such reactions.

An extensive file of proprietary ingredients of industrial materials is also available from the Center. For further information, particularly on materials such as Otto Fuel that are peculiar to the Navy, either write the Center or call: Autovon 989-3863.

HOSPITAL CORPS REQUESTS: CORRECT AND COMPLETE

A number of incorrect or incomplete Enlisted Transfer and Special Duty Requests (NAVPERS 1306/7) have been received at BUMED Code 34. In the future, all such deficient requests shall be returned to the responsible personnel officer for correction.

Personnel officers should also ensure that applicants meet all prerequisites for the desired training. Since most quotas can be filled by personnel who satisfy all eligibility criteria, waivers of requirements are generally not granted.

NRMC PORTSMOUTH PEDIATRIC RESIDENTS EXCEL

The Pediatric Residency Program at NRMC Portsmouth, Virginia, has produced 19 graduates who sat for the written examination of the American Board of Pediatrics for the first time between 1971 and 1975. Some 7,318 physicians from 240 programs were examined during this period.

The Portsmouth graduates scored a mean of 550, while the median of the 240 participating programs was 453. Collectively, they ranked first in examination performance. In the six sub-areas of the examination, the Portsmouth graduates collectively ranked first in two sub-areas, and second, third, sixth, and eighth in the remaining sub-areas.

This performance is a tribute to the teaching staff and residents of NRMC Portsmouth. A large share of the credit is due to CAPT James Hughes (MC), who was on the pediatric staff from 1965 to 1967, and was chairman of the Department of Pediatrics until 21 July 1975.

INFORMATION SYSTEMS INTERFACE

Work has begun on an automated interface between BUMED's Manpower Information System (BUMIS) and the Manpower and Personnel Management Information System (MAPMIS) of the Bureau of Naval Personnel. Plans call for restricting this interface initially to a limited number of data fields within the Medical Corps, with later expansion to all corps. The first phase of the automated interface will be implemented this month.

FORT FISHER GETS REMOTE DIAGNOSIS SYSTEM

The USS Fort Fisher is the third ship to be equipped with the remote medical diagnosis system now under study at the Naval Electronics Laboratory Center, San Diego. Tests continue aboard the USS Juneau and USS Alamo.

EMERGENCY MEDICAL TREATMENT FOR

INSECTICIDES

Chemical Basis	Chlorinated Hydrocarbons	Organophosphorus Compounds	Carbamates	Arsenicals (Inorganic)	Halogen Fumigants	Cyanide Fumigants
COMMERCIAL PRODUCTS AND GENERIC NAMES	**ALDRIN** **Benzene Hexachloride (BHC)** **Chlordane** **Chlorodecone (Kepone®)** **DDT** **Dicofol (Kelthane®)** **DIELDRIN** **ENDOSULFAN (THIODAN®) NB**	**Abate®** **AZINPHOSMETHYL (GUTHION®)** **CARBOPHENOTHION (TRITHION®)** **Chlorpyrifos (Dursban®)** **DEMETON (SYSTOX®)** **Diazinon** **Dicapthon (Di-Captan®) NB**	**ALDICARB (TEMIK®)** **Carbaryl (Sevin®) NB** **CARBOFURAN (FURADAN®)** **FORMETANATE HCL (CARZOL®)** **Metalkamate (Bux®)** **METHOMYL (LANNATE®)**	**LEAD ARSENATE** **PARIS GREEN** **SODIUM ARSENITE**	**METHYL BROMIDE** **SULFURYL FLUORIDE (VIKANE®)**	**ACRYLONITRILE (ORGANIC BOU CYANIDI** **CALCIUM CYANIDE (CYANOGA** **HYDROGEN CYANIDE (HYDROCYANIC AC**
PHARAMACOLOGIC ACTION OR SITE OF TOXICITY	**Neurotoxic** **CNS, Kidney** **Liver**	**Anticholinesterase (Irreversible)**	**Anticholinesterase (Reversible)**	**Cell Metabolism**	**Kidney, CNS depressant**	**Cell Metabolism**
ROUTES OF ABSORPTION	**Ingestion** **Inhalation** **Dermal**	**Ingestion** **Inhalation** **Dermal**	**Ingestion** **Inhalation** **Dermal**	**Ingestion** **Inhalation**	**Ingestion** **Inhalation** **Dermal**	**Ingestion** **Inhalation**
TOXICITY	**Low to HIGHLY TOXIC**	**Low to HIGHLY TOXIC**	**Low to HIGHLY TOXIC**	**HIGHLY TOXIC**	**HIGHLY TOXIC**	**HIGHLY TOXIC**
SYMPTOMS	Twenty minutes to four hours Nausea. Vomiting. Restlessness. Tremor. Apprehension. Convulsions. Coma. Respiratory failure. Death.	1. MILD - anorexia, headache, dizziness, weakness, anxiety, tremors of tongue and eyelids, miosis, impairment of visual acuity. 2. MODERATE - nausea, salivation, lacrimation, abdominal cramps, vomiting, sweating, slow pulse, muscular tremors. 3. SEVERE - diarrhea, pinpoint and non-reactive pupils, respiratory difficulty, pulmonary edema, cyanosis, loss of sphincter control, convulsions, coma, and heart block.	Constriction of pupils. Salivation. Profuse sweating. Lassitude. Muscle incoordination. Nausea. Vomiting. Diarrhea. Epigastric pain. Tightness in chest.	Thirty minutes to many hours Vomiting Profuse painful diarrhea—bloody later. Colicky pains in esophagus, stomach and bowel. Dehydration, thirst, muscular cramps. Cyanosis, feeble pulse and cold extremities. Headache. Dizziness, vertigo. Delirium or stupor. Skin eruption. Convulsions. Three terminal signs: Coma. General paralysis. Death. Chief initial symptoms of ingestion are those of a violent gastroenteritis, burning esophageal pain, vomiting, watery or bloody diarrhea containing much mucous, later collapse, shock, marked weakness. Death generally due to circulatory failure. INHALATION: may cause pulmonary edema, restlessness, dyspnea, cyanosis and foamy sputum.	Appears after four to twelve hours following inhalation. Symptoms include dizziness, headache, anorexia, nausea, vomiting, and abdominal pain. Lassitude, weakness, slurring speech and staggering gait. Mental confusion, mania, tremors and epileptiform convulsions. Bromides cause: Rapid respiration, pulmonary edema, cyanosis, collapse, and death. Coma, areflexia, and death due to respiratory or circulatory failure. Late manifestations may include bronchopneumonia, pulmonary edema, and respiratory failure. Methyl bromide may produce cutaneous blisters and kill via dermal exposure.	One of fastest acting poisons. Massive dose — unconsciou and death without warning. S ler doses — illness may last or more hours. Following ingestion, bitter, burning taste followed by cons ion of membrane in throat. Salivation and nausea wi vomiting. Anxiety, confusion, dizziness. Variable respirations—inspir short and expiration prolonged. Odor of bitter almonds in b and vomitus. Initial increas blood pressure and slowing of followed by rapid and irre pulse, palpitation, and constri of chest. Unconsciousness, convulsions, death from respiratory failure.
TREATMENT	1. Gastric lavage with 2-4 L. tap water. Catharsis with 30 gm. sodium sulphate in one cup of water. 2. Barbiturates in appropriate dosages repeated as necessary for restlessness or convulsions. 3. Watch breathing closely. Aspirate, oxygen and/or artificial respiration if needed. 4. AVOID OILS, OIL LAXATIVES and EPINEPHRINE (ADRENALIN). DO NOT GIVE STIMULANTS 5. Give calcium gluconate (10% in 10 ml. ampules) intravenously every four hours. 6. DO NOT INDUCE EMESIS IF THE INGESTED POISON IS PRINCIPALLY A HYDROCARBON SOLVENT (e.g., kerosene). See note (1) below.	SPEED IS IMPERATIVE 1. FOR EXTREME SYMPTOMS OF O.P. POISONING INJECT MASSIVE DOSES OF ATROPINE I.V. (2 TO 4 MG. OR 1/30 TO 1/15 GRAIN) EVERY 5-10 MINUTES UNTIL SIGNS OF ATROPINIZATION OCCUR. A TOTAL OF 25 TO 50 MG. OR MORE MAY BE NECESSARY DURING THE FIRST DAY. WATCH FOR REDUCTION IN SALIVATION. Do not give atropine to a cyanotic patient. Give artificial respiration first then administer atropine. Oral atropine is never used and atropine prophylaxis is not recommended. 2. 2-PAM (Protopam chloride), 1 gm. I.V. slowly over a period of 5 minutes. Give a second dose of 500 mg. in 30 minutes if muscle weakness persists. 3. AVOID MORPHINE, THEOPHYLLIN, AMINOPHYLLIN, BARBITURATES OR PHENOTHIAZINES. 4. Keep airway open. Aspirate, use oxygen, insert endotracheal tube. Artificial respiration and tracheostomy in severe cases. 5. For ingestion, lavage stomach with 5% sodium bicarbonate. 6. For skin contact, wash with soap and water. Wear rubber gloves while washing contact areas. 7. Draw blood for cholinesterase test, preferably before 2-PAM is given.	SPEED IS IMPERATIVE 1. FOR EXTREME SYMPTOMS INJECT MASSIVE DOSES OF ATROPINE I.V. (2 TO 4MG. OR 1/30 TO 1/15 GRAIN) EVERY 5 - 10 MINUTES UNTIL SIGNS OF ATROPINIZATION OCCUR. A TOTAL OF 25 TO 50 MG. MAY BE NECESSARY DURING THE FIRST DAY. WATCH FOR REDUCTION IN SALIVATION. 2. Keep airway open. Aspirate, use oxygen, insert endotracheal tube. Artificial respiration and tracheostomy in severe cases. 3. For ingestion, lavage stomach with 5% sodium bicarbonate. 4. For skin contact, wash with soap and water. Wear rubber gloves while washing contact areas. 5. Morphine may be given if needed. AVOID THEOPHYLLIN, AMINOPHYLLIN, OR BARBITURATES. 2-PAM is not indicated. Oral Atropine is never used, and Atropine prophylaxis is not recommended 6. Draw blood for cholinesterase test.	1. For ingestion lavage stomach with 2-3 L. of tap water and instill a glass of milk or a 1% solution of sodium thiosulfate. For skin contact, wash with soap and water. Acute symptoms will not develop except for sodium arsenite. 2. Saline cathartic (15 to 30 gm). 3. BAL in a 10% solution in oil—intramuscularly—(see schedule). 4. Check blood pressure and treat shock. 5. Isotonic saline for intravenous use to counteract dehydration. 6. Morphine may be needed for abdominal pain.	1. IN METHYL BROMIDE POISONING, EARLY TREATMENT WITH BAL MAY BE CONSIDERED IF GIVEN BEFORE SYMPTOMS APPEAR. First remove patient from contaminated area. 2. Remove all contaminated clothing and wash contaminated skin —can penetrate ordinary rubber gloves. 3. Restrain confused and maniacal patients. Barbiturates for convulsions. 4. May require specific therapy for acidosis, pulmonary edema, bronchospasm, (use epinephrine subcutaneously), respiratory paralysis and/or kidney failure.	SPEED IS IMPERATIVE 1. If apneic, start artificial res tion. Keep airway open. 2. INHALATION OF AMYL TRITE (AMYL NITRITE PERLES) every 15-30 sec while 3% sodium nitrite sol is being prepared. 3. Intravenous injection (even nonsterile solution) of 10 m 3% sodium nitrite over 2-4 ute period. DO NOT REM NEEDLE. 4. Through same needle give 5 of 25% solution of sodium sulfate over 10 minutes. 5. If symptoms recur, repeat nitrite and thiosulfate. 6. Stomach lavage with 1: potassium permanganate sh follow the above procedure 7. Oxygen therapy and whole b transfusions may be necessa nitrite induced methemogl emia becomes severe.
LABORATORY TESTS	No simple test. Only complex laboratory procedures. A high urine level of organic chlorine or especially of p-chlorophenyl acetic acid indicates exposure to DDT or to one of the analogous compounds. The level, however, is not indicative of the severity of exposure.	Cholinesterase test. Send 10cc heparinized blood to lab for plasma and red cell cholinesterase. Levels 30 - 50% of normal indicate exposure, although symptoms may not appear until the level falls to 20% or less. Urine p-nitrophenol may indicate exposure to parathion.	Cholinesterase test. Send 10cc heparinized blood to lab for plasma and red cell cholinesterase. Levels 30 - 50% of normal indicate exposure, although symptoms may not appear until the level falls to 20% or less. 1 - naphthol, normally found in traces, is excreted in urine in much higher concentration following Carbaryl (Sevin®) ingestion.	No simple test. Only complex laboratory procedures. Save initial stomach contents and urine for arsenic analysis. Urine may show red blood cells, albumin and casts. After arsenic inhalation, urine shows hemoglobin. Reinsch Test.	No simple test. Only complex laboratory procedures. Blood electrolytes to detect acidosis.	No simple test. Only con laboratory procedures. Send blood to lab for cya levels.

N.B. Additional Chlorinated Hydrocarbon compounds include:

ENDRIN
Heptachlor
Lindane (Isomer of BHC)
Mirex® (Dechlorane®)
PENTACHLOROPHENOL (PCP)
Toxaphene

N.B. Additional Organophosphorus compounds include:

DICHLOROVOS, DDVP (Vapona®)
Dimethoate (Cygon®)
DYFONATE®
ETHION NIALATE
FENSULFOTHION (DASANIT®)
Fenthion (Baytex®)
Gardona® (Rabon®)
Malathion
METHAMIDOPHOS (MONITOR®)
MEVINPHOS (PHOSDRIN®)
Naled (Dibrom®)
PARATHION
PHORATE (THIMET®)
PHOSPHAMIDON (DIMECRON®)
Rogor (Korlan®)
Supracide®
TEPP

N.B. Additional Carbamates compounds include:

MEXACARBATE (ZECTRAN®)
Propoxur (Baygon®)
SMDC (Vapam®)

DOSAGE SCHEDULE FOR BAL
(British Anti-Lewisite Compound) (of value in arsenic, and Methyl Bromide poisoning) (2, 3-Dimercapto-1-Propanol or Dimercaprol)

SEVERE POISONING	MILD POISONING
1st day — 3.0 MG/KG q4h (6 INJ.)	2.5 MG/KG q4h (6 INJ.)
2nd day — 3.0 MG/KG q4h (6 INJ.)	2.5 MG/KG q6h (4 INJ.)
3rd day — 3.0 MG/KG q4h (4 INJ.)	2.5 MG/KG q12h (2 INJ.)

Each of following ten days (or until recovery).
3.0 MG/KG q12h (2 INJ.)

ADDRESS AND TEL
NEAREST POISON

Center_____

Telephone Number_____

Address_____

ACUTE PESTICIDE POISONING

	RODENTICIDES		HERBICIDES			SOLVENTS
	Phosphine Fumigants	**Coumarins Indandiones**	**Organic acids and derivatives**	**Ureas**	**Miscellaneous**	**Hydrocarbons**
	ALUMINUM PHOSPHIDE (CELPHOS*, DELICIA* PHOSTOXIN*)	**Diphacinone (Diphacin*)** **FUMARIN*** **Pival* (Pivalyn*)** **PMP (Valone*)** **Warfarin** **FLUOROACETATE (COMPOUND 1080) NB**	**Cacodylic acid** **Dichlorophenoxyacetic acid (2, 4-D)** **DSMA, MSMA (Sodium Monoarsonates)** **Silvex (2, 4, 5-TP)** **Trichlorophenoxyacetic acid (2, 4, 5-T)**	**Bensulide (Betasan*)** **Bromacil (Hyvar-X*)** **Diuron (Karmex*)** **Fenuron - TCA (Urab*)** **Monuron (Telvar*)**	**Diquat (quarternary ammonia derivative)** **ENDOTHALL (Dicarboxylic acid derivative)** **PARAQUAT (quarternary ammonia derivative)**	**Petroleum Products including:** **Diesel oil** **Kerosene** **Gasoline** **Xylene**
	Lungs	**Anticoagulant**	**Liver** **Kidney**	**Respiratory**	**CNS** **Lungs** **Eyes**	**CNS** **Lung** **Kidney** **Liver**
	Inhalation	**Ingestion**	**Ingestion** **Dermal**	**Ingestion**	**Ingestion** **Inhalation**	**Ingestion**
	HIGHLY TOXIC	**Low (Single dose) to HIGHLY TOXIC (Multiple Doses)**	**Low Toxicity**	**Low Toxicity**	**Low to HIGHLY TOXIC**	**Low Toxicity**
	Nausea, vomiting, diarrhea, great thirst, headache, vertigo, tinnitus, pressure in chest, back pains, dyspnea, a feeling of coldness, and stupor or attacks of fainting. May develop hemolytic icterus and cough with sputum of a green fluorescent color. Chronic poisoning may be characterized by anemia, bronchitis, gastrointestinal disturbances, dental necroses, and disturbances of vision, speech, and motor functions.	After repeated ingestion for several days: Bleeding from nose, gums, and into conjunctiva, urine, and stool. Possible pallor and petechial rash. Late—massive ecchymoses or hematoma of skin, joints, brain hemorrhage. Shock and death. Fluoroacetate poisoning causes central nervous system stimulation.	Weakness, and perhaps lethargy. Anorexia, diarrhea. Muscle weakness—may involve the muscles* of mastication and swallowing. Ventricular fibrillation and/or cardiac arrest and death.	During handling may cause irritation of eyes, nose, throat and skin. Ingestion: May cause gastroenteritis.	May cause: lethargy. convulsions. coma.	Nausea. Vomiting. Cough and pulmonary irritation progressing to pulmonary edema, bloody sputum, and bronchopneumonia. Heavy ingestion can cause symptoms of depression or irritation, including coma and convulsions.
	No specific antidote. Keep patient quiet and warm. May need to treat incipient pulmonary edema with venesection, oxygen, and hypertonic glucose (50%) infusions. Intravenous isotonic solutions are contraindicated.	1. Lavage stomach with tap water. Catharsis 30 gm. sodium sulfate in 250 cc tap water. 2. Vitamin K (mephyton or menadione preparation) by mouth, intramuscularly or intravenously. Vitamin C may be a useful adjunct. 3. Transfuse with fresh blood if bleeding is severe or until anemia is corrected. 4. Iron (ferrous sulfate) by mouth for correction of secondary anemia, 0.3 gm. t.i.d. Fluoroacetate poisoning causes central nervous system stimulation (convulsions) and cardiac arrhythmias. Specific treatment includes Monacetin (glycerol monoacetate) intramuscularly, 0.5 mg per kg every half hour for 12 hours. Vary injection sites.	1. For ingestion, lavage stomach with tap water. For skin contact, wash exposed area. 2. Supportive treatment. 3. Quinidine sulfate or quinine to relieve myotonia or suppress abnormal ventricular cardiac rhythm.	1. For ingestion, lavage stomach with tap water. For skin contact, wash exposed area. 2. Supportive treatment. 3. Avoid contact with skin, eyes and clothing.	1. Lavage and catharsis. 2. May need artificial respiration. 3. Barbiturates for convulsions.	NO EMETICS Use care to prevent aspiration. To dissolve kerosene and slow absorption, give 250 ml. (8 oz.) of liquid petrolatum orally. Follow with saline cathartic. Use gastric lavage if more than 4 mg/kg. (⅛ pint/150 lb.) has been ingested. Remove patient to fresh air. Oxygen and corticosteroids may be needed in severe cases. Antibiotics are sometimes indicated.
	None	None. Prothrombin activity of blood plasma. Blood in urine and feces.	No simple test. Only complex laboratory procedures.	No simple test. Only complex laboratory procedures.	None.	Chest X-ray may reveal pneumonia after a time lag of 24-48 hours.

N. B.
Fluoroacetate is not an Anticoagulant

Notes:
1. For some insecticides (chlorinated hydrocarbons, botanicals) toxicity is chiefly that of solvent carrier rather than the insecticide compound itself, especially in diluted form. For treatment see "Solvents".
2. Gastric contents should be saved for analysis and legal purposes.
3. Common chemical and/or trade names derived from list prepared and distributed by FDA, DHEW, and Farm Chemicals Handbook. *Indicates trade name
4. Ranges of Toxicity (according to LD50's for rats and rabbits).

Category	Oral LD50(mg/kg)	Dermal LD50(mg/kg)	Inhalation LD50(mcg/L/hr	Probable Lethal Oral Dose for 70kg man (150 lbs)
Highly Toxic	0-50	0-200	0-2000	less than 1 tsp.
Moderately Toxic	50-500	200-2,000	2,000-20,000	up to 1 ounce
Low Toxicity	500-5,000	2,000-20,000	20,000 +	up to 1 pint
Slight Toxicity	5,000 +	20,000 +		up to 1 quart

Selected References:
+1. Clinical Toxicology of Commercial Products. Second Edition, 1963 Gleason, Gosselin, Hodge.
+2. Handbook of poisoning. Sixth Edition, 1969 Dreisbach.
3. Clinical Handbook on Economic Poisons. USPHS CDC, Atlanta, Ga.
4. Farm Chemicals Handbook, 1974.
5. Poisoning. Second Edition, 1958 Von Oettingen
+Recommended for all Armed Forces Medical Treatment facilities.

PHONE NUMBER OF CONTROL CENTER

For a two-color, 22" x 17" copy of this chart, write: Disease Vector Ecology and Control Center, Naval Air Station, Jacksonville, Florida 32212. Or telephone: (Autovon) 942-2425; (Area code 904) 772-2425.

The Similarity of Chief Complaints of Men and Women in a Naval Walk-In Clinic

LCDR Peter McL. Black, MC, USNR

There is a common belief that women consult doctors because of minor complaints more frequently than do men. "Psychological" complaints such as headache, nervousness, and general malaise are also believed to be more frequently experienced by women. And the complaints of patients seen in a general clinic are sometimes categorized as characteristically "male" or "female."

In an attempt to test these assertions, I recorded the chief complaint of 1,224 consecutive patients that I saw in a naval walk-in clinic over a period of five months. The clinic served as a screening and minor treatment center, referring patients to specialty clinics as required. Although women with self-diagnosed gynecologic problems could make an appointment directly with a gynecologist, there was a four- to eight-week delay before they could be seen; patients with urgent gynecologic problems were therefore also screened in our clinic. All medical treatment in the clinic was free, and no appointments were required. Only 10% of the patients were on active military duty; the other 90% were dependents of active duty naval personnel or retired personnel.

The patients considered in this study did not include persons seeking prescription refills, children under the age of 12, or patients on follow-up visits for a previous complaint. Patients with more than one complaint were listed under what I considered to be their major problem. Of the 1,224 patients, 715 (58%) were women.

The accompanying tables show the percentage of men and women who came to the clinic with a given complaint: Table I lists the complaints for which men significantly and proportionately outnumbered women; Table II, the complaints more frequently found in women than in men; and Table III, the complaints for which no significant difference was found between men and women. A chi square test, with level of significance $p < .05$, was used. More men than women were bothered by hemorrhoids and abdominal complaints other than pain, cramping, nausea, and vomiting. More women than men complained of dysuria, breast lumps, nervousness, and fatigue. For 22 other complaints there was no significant difference.

DISCUSSION

This study tried to answer three questions:

1) Do more women than men come to a free walk-in clinic with minor problems such as colds, sore throats, skin rashes, or sinus troubles?

2) Do women complain of "psychological" symptoms, such as general malaise, headache, fatigue, weakness, and nervousness, more often than men?

3) Does any particular set of complaints seem more common to one sex than to the other?

A physician's definition of a "minor" complaint may differ from his patient's. Assuming, however, that common colds, sore throats, sinus congestion, and skin rashes are minor complaints, there is no difference in their frequency between

From the Naval Regional Medical Clinic, Washington, D.C. 20372.

At the time this paper was written, Dr. Black was serving in the Office of the Attending Physician, U.S. Capitol, Washington, D.C. He is now a member of the resident staff of Massachusetts General Hospital, Boston.

TABLE I. Complaints More Frequently Seen In Men

Complaint	Percent women with given complaint	Percent men with given complaint	Mean percentage with given complaint	Probability that difference is chance alone
Rectal bleeding	.8	2.8	1.8	$p < .01$
Abdominal complaints other than pain, nausea, vomiting or bleeding	.8	2.6	1.7	$p < .01$

TABLE II. Complaints More Frequently Seen In Women

Complaint	Percent women with given complaint	Percent men with given complaint	Mean percentage with given complaint	Probability that difference is chance alone
Nervousness	2.4	.8	1.6	$p < .02$
Fatigue	2.5	.8	1.7	$p < .05$
Urine burning	5.6	2.4	4.0	$p < .01$
Breast lumps	1.8	.4	1.1	$p < .02$

TABLE III. Complaints For Which Difference Between Men And Women Is Not Statistically Significant ($P < .05$, chi square test)

Complaint	Percent women with given complaint	Percent men with given complaint	Mean percentage with given complaint
Complaints from Table I	1.6	5.4	3.5
Complaints from Table II	12.3	4.4	8.4
Sore throat	7.6	8.3	7.9
Cough	5.7	7.7	6.7
Abdominal pain	7.8	6.3	6.6
Leg-ankle-foot pain	4.8	6.9	5.8
Skin rash	6.7	4.5	5.6
Cold	4.6	5.5	5.0
Back pain	3.8	5.9	4.8
Earache	5.6	3.9	4.8
General malaise	3.5	5.7	4.6
Neck pain	3.6	5.1	4.4
Skin lumps	2.7	4.3	3.5
Eye problem	3.2	3.5	3.4
Chest pain	2.5	3.9	3.2
Miscellaneous genitourinary	2.9	3.1	3.0
Miscellaneous ear-nose-throat	2.9	2.8	2.8
Hand complaints	2.5	2.8	2.6
Sinus	3.1	2.2	2.6
Nausea or vomiting	2.4	1.4	1.8
Headache	3.1	1.4	2.2
Dizzy, weak	1.5	1.2	1.4
Hypertension	.4	.8	.6
Other	5.0	4.3	4.7
Total	99.8%	101.3%	99.9%

men and women. In fact, unless dysuria, breast lumps, fatigue, and nervousness are the only minor complaints one is willing to recognize, women do not have more minor complaints than men, at least in this free walk-in clinic setting.

The definition of a "psychological" complaint is as unclear as that of a "minor" complaint. Of the complaints listed in these tables, nervousness and fatigue are perhaps usually associated with diagnoses of anxiety neurosis or depression. On the other hand, chest pain, shortness of breath, palpitations, abdominal pain, extremity pain or numbness, general malaise, and constipation may also indicate these disorders (*1*). No conclusion as to whether women will have psychiatric diagnoses more often then men can be drawn from these data.

It does appear that in this clinic more women than men complain of nervousness or fatigue. But it is not clear whether this is because the prevalence of psychiatric conditions is higher among women, because women display their psychiatric illnesses in different ways than men, or because women go to their doctor more often than men. Only this can be said: Two of the many symptoms that sometimes indicate psychiatric conditions are more common in women than in men.

The answer to the third question—whether any complaints are more characteristic of one sex than the other—is clear, but difficult to explain. In this setting, rectal bleeding and certain miscellaneous abdominal problems (rectal spasm, diarrhea, jaundice) troubled more men than women; fatigue, nervousness, dysuria, and breast masses troubled more women than men. There is no obvious pattern in these complaints.

Apparently, anatomical differences explain why dysuria and breast lumps are more common in women than men. But it is not easy to explain why men have more hemorrhoids yet do not have more chest or back pain, or why women have more fatigue and nervousness but not significantly more headaches or abdominal cramps. It is possible that in this setting some women with abdominal complaints will refer themselves directly to a gynecologist. In general, however, in this clinic no easy predictions can be made about which complaints will be more common to women and which will be more common to men.

Most men and women came to this clinic with similar complaints. The complaints for which there was a statistically significant difference could not be categorized as "minor" or "psychological," and there was no obvious reason why these complaints should be more frequently experienced in one sex than in the other.

SUMMARY

The chief complaints of 509 male and 715 female patients in a free walk-in clinic were compared. There was no significant difference in the prevalence of sore throat, cough, abdominal pain, skin rash, or 18 other categories of complaint. Significantly more women than men complained of dysuria, breast nodules, nervousness, and fatigue. Men outnumbered women in complaints of rectal bleeding or pain, and miscellaneous gastrointestinal problems. These data do not indicate that, in a free walk-in clinic setting, women have more minor complaints than men.

REFERENCES

1. Cassidy WL, Flanagan MD, Spellman MR, Cohen ME: Clinical observation in manic depressive disease—a quantitative study of 100 manic-depressive patients and 50 medically sick controls. JAMA 164:1535-46, 1957.

Reducing Delays in Early Coronary Care

LCDR Noel J. Watson, MC, USNR

INTRODUCTION

High mortality figures for coronary artery disease in the United States are widely reported (*1,6*). The frequency of early morbid events (*3*) and the problem of patients being delayed in reaching an intensive care unit (*2,4*) have been well studied, and combine to increase mortality. Indeed, more than half of all deaths from myocardial infarction occur before the patient reaches a hospital (*7,8*). Thus, of the deaths that occur because of reversible complications, especially arrhythmias, many might have been avoided had the patient been given earlier care.

Patients, physicians, nursing personnel, and administrative clerks may all be partially responsible for the tragic delay. I myself have observed major problems in this area in several large institutions. Thus, while clinical research in techniques and medications brings minor improvements in mortality figures, a major area for improvement remains largely unattended, at least in some hospitals.

To accumulate clinical data with which to identify problem areas in the early management of coronary artery disease, we studied patients who were admitted to our large community teaching hospital in the Midwest because of myocardial infarction. This study was conducted as part of a cardiology rotation within the hospital's family practice residency training program.

LCDR Watson is a staff physician in the Department of Family Practice, NRMC Camp Pendleton, California 92055.

The work reported in this paper was done early in 1974 while Dr. Watson was a third-year resident at Miami Valley Hospital, Department of Family Practice, Dayton, Ohio 45409.

METHODS

For approximately two months we studied all patients admitted to the hospital with the diagnosis of myocardial infarction (MI) or "rule out MI." The latter group of patients were included because they merit immediate monitored care as urgently as do patients with an established diagnosis of MI. We took a detailed history, giving special attention to the nature of the symptoms, the time they began, and the patient's initial response, including self treatment and lay or medical consultation. We determined how the patient eventually arrived at our facility. We also obtained a history from family and friends, especially when the patient's morbid condition prevented us from obtaining first-hand information.

We then reviewed emergency room records, noting the arrival times stamped therein. From nursing notes we determined the time each patient arrived on the intensive care unit. All patients were followed until discharge or death. A final diagnosis was established for every patient, even if only "chest pain of undetermined cause."

During our study, a total of 111 patients were admitted to the hospital with actual or suspected MI. We obtained enough information on 106 of these patients to include them in our study. Their ages ranged from 17 to 88, with a mean age of 56.6 years. There were 71 males (mean age 55.3) and 35 females (mean age 58.9).

The final diagnoses are listed in order of frequency in Table 1. The diagnosis of MI was made in 44 patients (mean age 57.5), of whom 33 were male (mean age 55.7) and 11 were female (mean age 62.5).

TABLE 1. Final Diagnoses in Order of Frequency

1. Acute myocardial infarction
2. Angina
3. Gastrointestinal disorders
4. Atrial arrhythmias
5. Chest wall pain
6. Depression or anxiety
7. Chest pain, cause undetermined
8. Hyperventilation syndrome
9. Aortic aneurysm rupture

RESULTS

The most important findings of this study concern time intervals. The mean time lapse from onset of symptoms to notification of physician was 4 hours and 25 minutes. This is basically the amount of time that passed before the patient entered the health care system, whether "physician notification" was by telephone, in an office, or in an emergency room. The mean time from onset of symptoms to arrival at the hospital was 5½ hours. When patients presented to the emergency room, a mean time of 2 hours and 13 minutes passed before they arrived in the Intensive Care Unit. Finally, a mean time of 7 hours and 37 minutes lapsed from onset of symptoms to arrival in the intensive care unit. These data are summarized in Table 2.

Other data regarding mortality, complications, and predisposing factors were similar to data collected in previous studies and confirmed that our cases were representative. For example, the overall mortality among patients with MI was 21%.

TABLE 2. Mean Time Intervals

Onset of symptoms to notification of physician	4 hr 25 min
Onset of symptoms to arrival at hospital	5 hr 30 min
Arrival at emergency room to arrival in ICU	2 hr 13 min
Onset of symptoms to arrival in ICU	7 hr 37 min

DISCUSSION

At the heart of this study are the individual histories, relating the events that transpired for each patient from onset of symptoms until arrival in an intensive care unit. These cannot be tabulated. However, extraordinary delaying tactics were found to originate with patient, family, physician, and other involved personnel. Patient and family error stems primarily from poor understanding of heart disease. Delays originating with physicians generally relate to their unavailability, inappropriate transfer and consultation, and occasionally poor judgment. Clerical personnel often generate delays through insistence on orderly procedures and prescribed paperwork, as well as through poor planning in the emergency room.

The time lapses cited support our impression that the problem of delay requires improved management. Our time intervals are generally greater than those reported in other studies (*4*), partly because the previous studies often eliminated so-called prodromal or premonitory symptoms. Other studies may also define time intervals differently (*1,2*).

On the basis of this information, we propose the following recommendations to improve early care of MI:

1) Patient education should be emphasized, especially for "high risk" patients with angina, an established diagnosis of arteriosclerotic coronary artery disease, a history of previous MI, or multiple risk factors, such as diabetes, hypertension, a history of heavy smoking, or a strong family history of early coronary artery disease. These patients should be aware of the symptoms that are most likely to be significant (crushing and prolonged pain, or pain associated with shortness of breath and heavy perspiration) and be able to differentiate these symptoms from those of simple stable angina. In addition, patients should know that sublingual nitroglycerin may be taken serially at five-minute intervals up to three times. They should know to report to a medical facility if the pain continues. (This does not imply, however, that patients must diagnose their own illnesses.) In addition, patients should be well acquainted with community emergency services (*5*).

2) Certain physician-generated delays can be decreased. For example, early transfers from one hospital to another should be avoided. Direct admission from home or office to the intensive

care unit is better than referral of the patient to the emergency room for evaluation. Generally, referral from one physician to another should be postponed until *after* the patient is in the ICU. Only after the patient is being monitored should a referral be made to "rule out MI."

3) Patients should always be able to reach their physician or some other competent source of professional medical advice. In some areas a community-wide patient information service has been proposed. In view of the difficulties our patients experienced in trying to contact their physician, some kind of a well-publicized information system would probably be of considerable value.

4) Emergency rooms should have contingency plans for the rapid care of all patients who present with possible MI complaints. Treatment should never be delayed in order to determine whether the private physician or the emergency room physician will evaluate the patient. Continuing education programs specifically designed for clerical personnel and paramedical personnel in emergency rooms and other outpatient facilities would help correct some of these problems. Obviously, emergency rooms should also have monitoring and critical care nursing capability.

5) Since patients with MI may need immediate care from a house officer or other not familiar with their history, an admission note and complete list of problems should be placed in their chart as soon as possible. The emergency room physician should prepare this information if the patient's private physician is not available.

SUMMARY

A reasonable attempt can be made to decrease early mortality from myocardial infarction by studying sources of delay in early monitoring and care of patients. Performing such a study can be a highly educational experience for a resident physician in family practice or internal medicine. One method of studying this problem is described, with results and subsequent recommendations.

Acknowledgement:

My thanks to Donna Borgert, RN, a dedicated and concerned nurse-clinician, for her assistance with this study.

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X-RAY FLUORESCENCE ANALYSIS MAY AID MEDICAL RESEARCH

The X-ray fluorescence analysis technique developed by the Naval Research Laboratory (NRL) for studying air and water elements (NRL Science Trend 26-11-74) may find similar application for medical researchers in analyzing body fluids.

NRL scientists LaVerne Birks and John Gilfrich say biological problems in trace analysis or microanalysis which previously were beyond the capability of X-ray fluorescence may now be within reach.

Recently, important changes in the capabilities and applications of X-ray fluorescence analysis were evolved at NRL as a pressing need for new analysis of particulate air and water pollution gave impetus to advancement in specimen geometry and data interpretation.

Birks and Gilfrich report that these and other improvements in the use of the X-ray fluorescence method to measure extremely small concentrations economically and rapidly suggest applications in clinical medicine and biology not previously possible. For example, by ashing or freeze-drying tissue sections, it may be possible to reduce unwanted specimen masses (as was done for air and water pollution samples), the NRL researchers say. This, in turn, would allow better detectability for trace concentrations of metals, which may be important for normal body function.

Birks and Gilfrich also report that reduction in background interference through better sample geometry, and increased resolution of their crystal spectrometer has improved the detectability of their system by a factor of 10 to 100 times. This gives the researchers a capability for direct measurement of a few nanograms or less of most elements.—PAO, NRL, Washington, D.C.

NOTES & ANNOUNCEMENTS

MEDICAL DEPARTMENT SUPPORTS SHORSTAMPS

During the past few months, all BUMED-managed activities have been actively involved in procedures basic to the development of the Navy's Shore Requirements, Standards, and Manpower Planning System (SHORSTAMPS).

SHORSTAMPS is a manpower planning system, being developed under the auspices of the Assistant Secretary of the Navy (Manpower) and the guidance of the Chief of Naval Operations, which will provide a tool for determining the minimum numbers and types of billets and positions required by each Navy activity to accomplish its assigned mission. Once fully operational in 1980, this system will provide BUMED and each commanding officer the capability to assess and analyze future manpower requirements as missions, functions, equipments, technology, and workload change.

SHORSTAMPS is comprised of two subsystems: Shore Required Operational Capability (SHOROC); and Navy Staffing Standards. Both subsystems are in the developmental stage.

SHOROC is a structured tasking vocabulary composed of statements called Required Functional Capabilities (RFCs), which will eventually cover all mission areas and tasks performed ashore. In essence, it will enable the Navy to identify by common terminology the different tasks performed at a given activity. Under the SHORSTAMPS program, standards will be developed for each RFC, using accepted industrial and management engineering techniques. Standards will be based on a functional approach, rather than solely an organizational approach.

All BUMED-managed activities are currently developing SHOROC input forms. Tasks performed at each activity are being identified using SHOROC terminology or RFC statements. Because future activity manpower requirements will be based on SHOROC input, it is imperative that commands identify all tasks and that accurate parameters be developed for each task.

The Navy Manpower and Material Analysis Centers, Atlantic and Pacific (NAVMMACLANT and NAVMMACPAC), are tasked with the development of staffing standards for the entire Navy shore establishment (less Marine Corps). During the preliminary phase of each staffing standards study, selected commands will be visited to accurately and precisely define the functional area being studied. A measurement plan will be developed to include the definition of the functional area, the procedures to be used to collect workload data during the measurement phase of the study, and the industrial engineering work measurement technique to be used. BUMED will review these plans. Commands selected as sites for the conduct of the measurement plan will be notified, and should provide assistance to the NAVMMACs as required. Development and the implementation of the Navy's SHORSTAMPS program will require much effort from individuals at all echelons of command.

The Manpower Management and Requirements Division, Code 37, is the liaison and coordination point in BUMED for this program. The staff of the Division is ready to assist medical activities with this or any other manpower management matters.—BUMED Code 00.

VIRAL HEPATITIS B

For the past few years, health professionals have become increasingly anxious about their role in the spread of viral hepatitis B. Their concern has centered not only around their increased risk of infection, but also around their ability to transmit the disease to patients. One of several foci of the controversy is that of dentists and oral surgeons who are at increased risk of acquiring hepatitis B through cuts on their hands and who,

as chronic carriers of the antigen, might retransmit the illness to patients through this "hemo-oral" route.

The discovery and widespread application of a sensitive immunologic indicator has enormously enhanced our knowledge of the epidemiology of viral hepatitis B. Hepatitis B surface antigen (HB_sAg), formerly known as Australia antigen and hepatitis-associated antigen, has been identified not only in serum, but also in the feces, urine, saliva, and seminal fluid of hepatitis B patients and asymptomatic carriers. These observations have prompted reassessment of long-accepted transmission concepts. Although parenteral transmission is still the prominent mode of spread and the basis of most reported outbreaks, fecal-oral and hemo-oral transmissions have been documented. Sexual partners of antigenemic carriers (HB_sAg+) also seem to be at increased risk, and it has been postulated that salivary carriers can spread the disease via direct contact or droplet nuclei. Although the significance is unclear, HB_sAg has also been identified in pools of urban and sylvan mosquitoes.

Since its inception, effective infection control in the setting of a medical and dental treatment facility has relied not just on *post facto* investigation of outbreaks but, in addition, on scrupulous attention to cleanliness, careful nursing and housekeeping practices, hygienic food service, and laboratory asepsis. These measures will continue to limit the transmission of viral hepatitis B to and from health care professionals. The routine and ritualistic screening of our clinical and food service personnel for HB_sAg does not seem warranted at this time.—BUMED Code 00.

DENTAL ALUMNI GATHER

The National Naval Dental Center (NNDC) held its first alumni reunion 22-23 August 1975. Among the former graduates who attended were RADM Robert W. Elliott, Jr. (DC), assistant chief for dentistry and chief, Dental Division, Bureau of Medicine and Surgery; RADM George D. Selfridge (DC), commanding officer, NNDC; RADM George A. Besbekos (DC), commanding officer, Naval Regional Dental Center Norfolk, Virginia; and retired RADMs Alfred W. Chandler (DC) and Edward C. Raffetto (DC), both former assistant chiefs for dentistry and chiefs of the Dental Division.—BUMED Code 6.

ACCELERATED MEDICAL CONSTRUCTION PROGRAM

During late 1971 and early 1972, the Assistant Secretary of Defense for Health and Environment (OASD[H&E]) met with representatives of the medical departments of the three services to discuss medical facility deficiencies and how to correct them. On 19 February 1972 the Secretary of Defense directed the Navy to submit plans for modernizing or replacing all inadequate medical facilities during the period FY74 to FY78. This action effectively compressed into 5 years a modernization program that might have required 10 to 15 years to accomplish under normal funding constraints.

The accelerated facilities modernization program is designed to update or replace medical facilities in order to improve personnel efficiency and professionalism. By program budget memorandum dated 5 August 1972, the Navy Department was provided a five-year funding program to correct medical facility deficiencies through military construction in fiscal years 1974 through 1978. The five-year construction program has been extended into FY81 to complete the medical modernization program.

On 29 July 1974 the Navy medical modernization program was split into two parts, one funded through Navy, the other funded through the Office of the Secretary of Defense (OSD). The OSD program is funded through OASD(H&E) as a medical construction contingency fund.

It is the Navy Medical Department's goal to upgrade or replace inadequate health care facilities in order to provide hospitals, clinics, and support facilities that meet recognized standards and codes of the medical, dental, and engineering communities. Improvements in Navy health care facilities are necessary in order to provide Navy and Marine Corps active duty personnel, their dependents, and other authorized beneficiaries with the highest attainable level of health care; improvements are necessary to provide health care professionals with technically adequate facilities in which to practice.

The FY74 accelerated medical construction program authorized by Congress contained 23 projects. One is completed, 20 are under construction, 1 has not been recertified as a current valid requirement, and 1 has been deferred.

In the FY75 accelerated medical construction program, 25 projects are authorized and appropri-

ated. Twenty are under construction and five are being prepared for advertising.

The FY76 program is currently before Congress, but has not yet been approved. Three of the six FY76 projects are identified with either the Trident or energy conservation programs, and are not directly associated with the medical program.

Here is a summary of the projects included in each year's accelerated military construction program:

FY74: Approved projects include medical/dental clinics at NAS Barbers Point, Hawaii; NAS Chase Field, Texas; Naval Training Center, Great Lakes, Illinois; NAS Kingsville, Texas; Amphibious Base, Little Creek, Virginia; NAS Meridian, Mississippi; and NAS Whiting Field, Milton, Florida. Also under construction is a medical clinic at Marine Corps Recruit Depot San Diego, California, and a dental clinic at NAS Lemoore, California. An addition to the medical clinic at Naval Shipyard Charleston, South Carolina, has been completed. Improvements are authorized for medical facilities at NRMC Great Lakes, NH Guantanamo Bay, Cuba, NRMC Guam, NRMC Oakland, California, and NH Quantico, Virginia. Phase II of construction of the Environmental Health Effects Laboratory at Naval Medical Research Institute, Bethesda, Maryland, is under way, as is a 150-bed addition to the 100-bed naval hospital at New Orleans, Louisiana, authorized in FY73; a recruit inprocessing facility at Great Lakes; and replacement of the Naval Environmental and Preventive Medicine Unit #6 at Pearl Harbor, Hawaii.

FY75: Construction is under way on medical/dental clinics at Edson Range, Camp Pendleton, California; NAVSTA Mayport and NAS Cecil Field, Florida; and NAS Memphis, Tennessee. The medical/dental clinic at NAS New Orleans is getting an addition, and medical clinics are going up at Camp Pendleton. Dental clinics are being built at San Onofre, Camp Pendleton; NRDC Charleston; NRDC San Diego; and Construction Battalion Center, Port Hueneme, California. Improvements are being made at the National Naval Medical Center, Bethesda; NH Beaufort, South Carolina; NRMC Jacksonville, Florida; NRMC Philadelphia, Pennsylvania; and the Hadnot Point clinic at NRMC Camp Lejeune, North Carolina. Medical storage is being built for NH Lemoore, California. Also authorized, but not yet under construction, is modernization of NRMC Portsmouth, Virginia, medical/dental clinics for Naval Weapons Center, China Lake, California, and NAS Oceana, and a medical clinic at Sewell's Point, NAVSTA Norfolk, Virginia.

FY76: Proposed projects include hospital replacement at NRMC Bremerton, Washington; health facility construction in Orlando, Florida; a 500-bed hospital for the National Naval Medical Center, Bethesda; and a new dispensary/dental clinic for the Trident Weapons Facility, Bangor, Washington. Also included are energy conservation improvements for NRMC Portsmouth, Virginia.—BUMED Code 412.

DENTAL ACDUTRA SITES DESIGNATED

Fourteen naval regional dental centers have been designated as active duty for training (ACDUTRA) sites for Selected Reserve naval regional dental center operational readiness units (ORU). The sites are at Camp Lejeune, North Carolina; Charleston and Parris Island, South Carolina; Washington, D.C.; Norfolk, Virginia; Newport, Rhode Island; Philadelphia, Pennsylvania; Pensacola and Jacksonville, Florida; Great Lakes, Illinois; Bremerton, Washington; and Long Beach, San Diego, and San Francisco, California.

Reserve naval regional dental centers must perform most of their annual two weeks of ACDUTRA at the type of activity they would support during mobilization. In most instances, the ACDUTRA site is the active naval regional dental center nearest to the ORU. Under the restructured Reserve training concept, Reserve units are encouraged to conduct annual ACDUTRA as a unit.

Commanding officers of ORUs have been directed to establish liaison with their respective active duty counterpart activity and to develop a meaningful ACDUTRA program. An officer at each of the 14 naval regional dental centers will be appointed as training coordinator to help the Reserve unit achieve this goal.

Because the Reserve dental officer is in active practice in civilian life, ACDUTRA will be geared toward refresher training such as updating of equipment; new concepts in the organization and management of military dental activities; military training; and review of Navy patient records, forms, and terminology. Professional training for enlisted personnel will be oriented more toward maintaining proficiency in Navy-acquired skills, preparation for advancement, and development of

new skills and knowledge. In addition, general military training will be conducted.

Although some classroom training may be required, emphasis will be placed on practical on-the-job training, with ORU personnel providing care to eligible beneficiaries at the activity.

Although the tasks a Reserve unit will perform in its active counterpart facility are a local managerial decision, the Chief of the Dental Division has suggested that Reserve units be employed to:

- Augment the staff of the Regular force during working hours, when space permits.
- Conduct a preventive dentistry program for dependents.
- Conduct screening examinations for ships' crews that depend upon the shore establishment for dental care.
- Conduct annual fluoride application required for all active duty personnel.
- Conduct annual periodontal screening survey for active personnel who have more than four years of service.—BUMED Code 6.

DENTAL CONTINUING EDUCATION COURSES SET FOR JANUARY

The following dental continuing education courses will be offered during January 1976:

National Naval Dental Center, Bethesda, Maryland

Oral pathology	12-16 Jan 1976
Removable partial dentures	26-30 Jan 1976

Eleventh Naval District, San Diego, California

Oral diagnosis	5-7 Jan 1976
Removable partial dentures	19-21 Jan 1976
Oral pathology	26-28 Jan 1976

U.S. Army Institute of Dental Research, Walter Reed Army Medical Center, Washington, D.C.

Oral surgery	12-15 Jan 1976

Consult BUMEDNOTE 1500 of 12 June 1975 when applying, with the exception of courses administered by the Commandant, Eleventh Naval District. The latter requests should be submitted to the Commandant, Eleventh Naval District (Code 37).

Cross-country travel for dental continuing education courses and professional conferences will generally not be approved because of funding limitations. Similarly, travel from outside the Continental United States will generally not be approved.—BUMED Code 6112.

FIVE WOMEN DENTAL OFFICERS COMMISSIONED

Five women were recently commissioned as lieutenants in the Dental Corps, United States Naval Reserve, bringing the number of women dental officers on active duty in the Navy to six. LT Birute A. Baliciunas, a graduate of Case Western Reserve University, Cleveland, Ohio, has reported to the Naval Regional Dental Center, Washington, D.C. LT Elizabeth E. Cuprak, a graduate of the University of Pittsburgh, serves at the Branch Dental Facility, Submarine Base New London, Connecticut. LT Dorothy E. Knuppel, a graduate of the University of Pennsylvania, is stationed at NRDC Charleston, South Carolina. LT Sheila M. McCabe, a Georgetown University graduate, and LT Dawn C. Schroeder, a graduate of the State University of New York at Buffalo, have been assigned to NRDC San Diego, California.

A sixth woman dental officer, LCDR Helen Paulus, DC, USN, stationed at the U.S. Naval Regional Dental Center, Guam, has been on active duty since July 1969.

Twelve more women officers are now participating in Navy dental student programs.—BUMED Code 6.

AFIP OFFERS POSTGRADUATE TRAINING

The following education programs are offered by the Armed Forces Institute of Pathology, Washington, D.C., during the remainder of Fiscal Year 1976. All of these postgraduate courses are open to qualified military and federally employed applicants. Qualified civilians will be accepted on a space available basis. Further information may be obtained from the Center for Advanced Medical Education, ATTN: AFIP-EDE, Armed Forces Institute of Pathology, Washington, D.C. 20306.

Otolaryngic Pathology Seminars
1-3 December 1975

Legal Medicine Symposium
8-9 December 1975

Application of Histochemistry to Pathology
5-8 January 1976

Genitourinary Pathology
19-23 January 1976

Neuropathology
26-30 January 1976

Pathology of Genetic Disease
2-6 February 1976

Orthopedic Pathology (Military Pathologists)
8-15 February 1976

23rd Annual Course in Oral Pathology
1-5 March 1976

Seminars in Diagnostic Radiology
1-5 March 1976
3-7 May 1976

Ophthalmic Pathology
15-19 March 1976

16th Annual AFIP Lectures
29 March-2 April 1976

Otolaryngology Basic Science Course
12 April-22 May 1976 (Military Only)

Comparative Pathology
10-12 May 1976

Aerospace Pathology
26-28 May 1976.

NRMC MEMPHIS SPONSORS DIABETIC EDUCATION SERIES

A series of four-day workshops entitled "Diabetes and You—Today and Tomorrow" is under way at NRMC Memphis, Millington, Tennessee. Sponsored by the Department of Continuing Education and the Clinical Nutrition Branch, the series provides patients with a comprehensive look at diabetes mellitus, its management, and family reactions to the disease.

Participants include military and dependent diabetics, members of their family, and staff members interested in learning how to teach and manage such patients. Topics discussed include the food exchange system, exercise and its relation to diabetes, common sense for common illnesses, foot and skin care, medications, hypoglycemia, ketoacidosis, and current trends in management and research. Highlights of the workshop are a discussion of restaurant dining, meeting the challenge in the commissary, and a pot-luck luncheon.—LCDR M. Ellen Stammer, NC, USN, NRMC Memphis.

ASSOCIATION OF NAVAL AVIATION

The Association of Naval Aviation was recently founded in Pensacola, Florida, to promote naval aviation through education and charitable programs, and to encourage public appreciation in this specialty. Additional information and membership applications are available from: The Association of Naval Aviation, Inc., c/o Naval Aviation Museum, Pensacola, Florida 32508.—*CHINFO Newsgram*, 18-75.

BARKING DOG AIDS OPHTHALMOLOGISTS

To the staff of the Ophthalmology Service at NRMC Oakland, California, it was a lucky day when a barking dog came to live in their clinic. The toy dog is a fixation device kept close by during examinations of young children. When the child starts to squirm or look around the room, the examiner just pushes a foot pedal, and the dog barks and wags his tail. The young patients invariably turn their eyes back to the dog—just what the examiner wants.

The dog was devised by HMC Gary Bryan of the Medical Repair Service.—*The Oak Leaf*, NRMC Oakland.

Sean Huurman, a 3-year-old patient at NRMC Oakland, studies a barking dog while the ophthalmologist studies *him*.

FLEET MEDICAL/DENTAL LIAISON OFFICES

BUMED Notice 6000 of 12 March 1975 requires all naval hospitals and regional medical and dental centers to establish a fleet liaison office to support personnel assigned to operational billets. Directories of the staff, location, and telephone numbers of each fleet liaison office must be prepared and disseminated. In particular, these directories must be sent to CINCLANTFLT, CINCPACFLT, and other appropriate fleet medical and dental offices.

Fleet mobile units that find it difficult to obtain assistance for medical and dental services should submit a report of such problems to BUMED Code 5 via the appropriate fleet medical and dental officers.

Here is a directory of fleet medical/dental liaison offices in the Pacific Fleet. Additional directories will be published periodically.

PACIFIC FLEET MEDICAL/DENTAL LIAISON OFFICE DIRECTORY

	Commercial Telephone	*Autovon*
NRMC SAN DIEGO, CALIF.		
Medical Liaison Office		
CAPT M.J. VALASKE, MC, USN	(714) 233-2415	727-3850
LT M.J. BENSON, MSC, USN	(714) 233-2641	727-3850
HMCM M. LUCHTER, USN	(714) 233-2421/22	727-3850
Dental Liaison Office		
CAPT C. DELAURENTIS, DC, USN	(714) 235-2171	958-1176
LT G.R. HARRINGTON, MSC, USN	(714) 235-1177	958-1176
DT1 B.D. GOAINS, USN	(714) 235-1326	958-1176
NRMC LONG BEACH, CALIF.		
Medical Liaison Office		
CAPT E.F. LATHAM, MC, USN	(213) 420-5469	873-9404
LTJG R.L. RUOFF, MSC, USN	(213) 420-5404	873-9404
HMCS G. O'KEEFE, USN	(213) 420-5389	873-9389
Dental Liaison Office		
LT K. VANCE, DC, USN	(213) 547-7436/7	360-7436
LCDR L.V. WOLFF, MSC, USN	(213) 547-7436/7	360-7436
DTCS A.T. EVANGELISTA, USN	(213) 547-7436/7	360-7436
NH PORT HUENEME, CALIF.		
Medical Liaison Office		
CDR M.W. WHITE, JR., MC, USN	(805) 982-4501	360-4501
LT R.P. BAULEY, MSC, USN	(805) 982-4501	360-4501
HMCS L.A. WINK, USN	(805) 982-4501	360-4501
NRMC OAKLAND, CALIF.		
Medical Liaison Office		
CAPT R.C. DRIPS, MC, USN	(415) 639-2115	855-2357/2115
LT J.F. RENISH, MSC, USN	(415) 639-2041	855-2041/2043
HMCM R. BROWN, USN	(415) 639-2357	855-2357/2358
Dental Liaison Office		
CDR R.E. CASSIDY, DC, USN	(415) 765-5554	869-5554
DTCM J.N. STUTZ, USN	(415) 765-6892	869-6892
NRMC BREMERTON, WASH.		
Medical Liaison Office		
CDR R.G. ADDISON, MC, USN	(206) 478-4353	439-4353
LTJG V.M. WILSON, MSC, USN	(206) 478-4415	439-4415
HM1 M. BARKER, USN	(206) 478-4367	439-4367
Dental Liaison Office		
CAPT J.E. MILLER, DC, USN	(206) 478-2213	439-2213
DTCM D.E. DENTON, USN	(206) 478-2213	439-2213

NAVREGMED CLINIC PEARL HARBOR, OAHU, HAWAII

	Commercial Telephone	Autovon
Medical Liaison Office		
Pearl Harbor		
CAPT L. ESKE, MC, USN	(808) 471-1256	430-0111
LT R.F. FIGURA, MSC, USN	(808) 471-1256	430-0111
HMCS D.A. MARTINEZ, USN	(808) 471-1256	430-0111
Barbers Point		
CAPT N. SANDBORN, MC, USN	(808) 684-2205	430-0111
LT B.T. SPARKS, MSC, USN	(808) 684-2205	430-0111
HMCM N. PEREA, USN	(808) 684-2205	430-0111
Kaneohe		
CAPT L.R. FOUT, MC, USN	(808) 257-3365	430-0111
LT R.E. MCKEE, MSC, USN	(808) 257-3365	430-0111
HMCS T.M. DANIELS, USN	(808) 257-3365	430-0111
Dental Liaison Office		
Pearl Harbor		
LT V.P. HARRISON, DC, USNR	(808) 471-8145	431-0111
LT D.J. TODD, MSC, USN	(808) 471-9636	431-0111
DT2 D. ELLENBURG, USN	(808) 471-9636	431-0111

NRMC GUAM

Medical Liaison Office		
CAPT R.B. WRIGHT, MC, USNR	344-9329	388-1110
LTJG J.E. SOLIDAY, MSC, USN	344-9355	388-1110
HMCM R.R. HUEMME, USN	339-4224	388-1110
Dental Liaison Office		
CDR M. ERVIN, DC, USN	339-3175/5145	339-3263
LT A.E. KENNEDY, MSC, USN	339-5266	339-3263
DTCS A.C. BABAUTA, USN	339-5266	339-3263

NRMC SUBIC BAY, R.P.

Medical Liaison Office		
CDR J.B. LENCH, MC, USN	885-9213	844-1101
LTJG T.A. KULCSAR, MSC, USN	885-9213	844-1101
HMC M.B. CASTRO, USN	885-9213	844-1101
Dental Liaison Office		
CDR J.E. GROAT, DC, USN	884-3245	844-6421
DT1 N.B. LEGASPI, USN	884-3245	844-6421

NRMC YOKOSUKA, JAPAN

Medical Liaison Office		
CAPT R.C. MYERS, MC, USN	234-7134	234-1110
LCDR T.E. THOMAS, MSC, USN	234-7134	234-1110
HMCM J.R. ALLMOND, USN	234-7132	234-1110
Dental Liaison Office		
CAPT W.R. MARTIN, DC, USN	234-7140	234-1110
DTC B.T. SANTONI, USN	234-7140	234-1110

U.S. NAVAL HOSPITAL TAIPEI, TAIWAN

Medical Liaison Office		
LCDR J.W. ALDIS, MC, USNR	871-5711 (ext 289)	723-5711
HMCM W.E. COX, USN	871-5711 (ext 279)	723-5711
Dental Liaison Office		
CAPT H.S. SAMUELS, DC, USN	871-5711 (ext 240)	723-5711
DTCS P.R. WORLAND, USN	871-5711 (ext 240)	723-5711

OFFICIAL INSTRUCTIONS AND DIRECTIVES

BUMEDNOTE 6700 of 15 July 1975

Subj: Sterilization package and storage of material in emergency medical supply blocks, kits and sets

Surgical material sterilized in surgical tubing will retain its sterility for long periods of time. Naval Alert Forces should use this technique while continuing to prepackage, autoclave, and store surgical packs in medical supply blocks. Medical departments aboard ships should use this concept for surgical material in battle dressing stations.

At least once a year, activities using this concept shall test randomly selected packs for sterility, and shall immediately inform BUMED of significant problems or test results. Defective or unsatisfactory surgical tubing should also be reported.

BUMEDINST 6401.1A of 1 August 1975

Subj: Military veterinary medical support to naval activities

Military veterinary service personnel are authorized on a nonreimbursable basis to support selected Navy and Marine Corps installations. Veterinary service personnel will inspect food supplies and off-base food processing facilities, and determine that perishable items are properly stored, handled, and transported. They will also investigate and recommend measures to prevent and control animal diseases, and shall provide medical and surgical services for Government-owned animals. Limited veterinary services for privately-owned animals of military personnel may be authorized. Duties performed by veterinary service personnel shall not duplicate any of the functions performed by Navy Medical Department personnel.

Upon request, local activities shall provide veterinary personnel with record management, disbursing, medical, dental, and other routinely provided services. Local activities shall fund required travel, real property facilities, communication, vehicular transportation, supplies, and equipment.

Naval activities requiring the support of veterinary medicine-public health personnel shall submit a "Request for Veterinary Services" (enclosure 1 to this instruction) to CHBUMED (Code 55) via the Navy Food Service Systems Office. Requests for veterinary research personnel shall be sent to CHBUMED (Code 55) via the Navy Medical Research and Development Command.

An interservice support agreement, using DD Form 1144, shall be prepared at the local level.

BUMEDINST 6224.1D of 8 August 1975

Subj: Tuberculosis Control Program

The Navy Tuberculosis Control Program consists of two parts: (1) *case finding*, which includes the annual tuberculosis screening program and the tuberculosis contact investigation program; and (2) *patient disposition*, which includes the management of tuberculin skin test convertors and the handling of suspected or proved cases of tuberculosis.

The tuberculin skin test is used for screening individuals whose previous skin tests were nonreactive or unrecorded. Only the Mantoux method of tuberculin testing using premixed Tween-80 stabilized intermediate strength PPD (5 TU) is authorized for routine use. Individuals with previously recorded reactive tuberculin skin tests are screened by X-ray examination of the chest. Requirements for annual reporting of the results of such tuberculosis screening programs have been extensively modified.

A tuberculosis contact investigation program must be started by each command whenever a present or former member of that command has suspected or confirmed active tuberculosis. Everyone who has been a close contact of the patient is screened for tuberculosis and reexamined 3, 6, and 12 months after the initial study. Medical Department personnel exposed to tuberculosis in the course of their work are exempt from the contact investigation requirements of this instruction only if a more stringent routine monitoring program is followed. The reports required and the forms to be used in these contact investigations have been revised.

Guidelines for the evaluation and management of patients with reactive tuberculin skin tests or suspected tuberculosis are provided in this instruction. When tuberculosis chemoprophylaxis is required, isoniazid (INH) is the drug of choice in personnel under the age of 35. Personnel over 35 may receive INH according to the provisions outlined. When extensive evaluation or treatment for tuberculosis is necessary, patient *must* be transferred to special treatment centers designated by the Bureau of Medicine and Surgery; currently these are limited to NRMC Portsmouth, Virginia; NRMC San Diego, California; and NNMC Bethesda, Maryland.

BUMEDNOTE 1610 of 13 August 1975

Subj: Remunerative professional civilian employment of Medical Department officers

This notice supersedes BUMEDNOTE 1610 of 22 January 1975, and promulgates revised guidelines for "moonlighting" by Medical Department officers. Reports are now due no later than the 10th day of the month following the reporting quarter: i.e., the November report is due no later than 10 December. Medical commands and departments submit reports to BUMED Code 3, with a copy to BUMED Code 6 if dental officers are assigned. Dental commands and departments submit reports to BUMED Code 6. The report symbol is MED 1610-1.

BUMEDNOTE 1510 of 18 August 1975

Subj: Hospital corpsman training

Formal training in electrocardiography technique has been discontinued, and the Navy Enlisted Classification HM-8453 deleted. Personnel and billets currently designated HM-8453 will be redesignated HM-0000.

Commanding officers should initiate local on-the-job training programs to meet their requirements for electrocardiography technicians. CHBUMED approval for such training is not required.

Because of prior commitments, Navy will continue to train Army personnel as electrocardiography technicians until the Army Medical Department develops an alternate plan.

BUMEDINST 1910.2G of 26 August 1975

Subj: Disposition of enlisted members by medical board action by reason of physical disability, military unsuitability, and enlisted in error

This instruction updates and supersedes BUMEDINST 1910.2F/BUPERSINST 1910.23. New information authorizes enlisted personnel who are being processed for separation from naval service under the provisions of this instruction, and who require continued hospitalization, to be transferred to a VA treatment facility. Referral of these cases to the Central Physical Evaluation Board is not required if the member has waived his rights to a hearing before a PED.

Within the limits of the provisions set forth in this instruction, enlisted personnel may be discharged for physical disability not incurred in or aggravated by service. However, no member shall be discharged for physical disability if he or she meets the minimum standards for enlistment or induction. Such cases shall be submitted for action to Commandant, Marine Corps or Chief of Naval Personnel via BUMED Code 332. Members may not be discharged by local action for physical disability if there is disciplinary action pending or uncompleted sentences of court-martial involving confinement or discharge, drug addiction, alcoholism, homosexuality, or criminalism.

The *Disability Evaluation Manual* of 1 October 1970, and MANMED Chap 18, Section III contain instructions regarding disposition of members considered unfit for duty because of physical disabilities incurred in or aggravated by service.

Personality disorders or mental retardation warrant discharge for administrative reasons when functional usefulness is so impaired as to cause military unsuitability. However, individuals diagnosed as having a psychosis, neurosis, organic brain syndrome, or transient situational disturbance may not be separated under these provisions.

Stuttering or stammering has been added as a special condition for which administrative separation processing or appearance before a medical board may be indicated.

If a waiver for enlistment has been granted for the defect for which an enlisted member is being considered for separation, the medical board report must be submitted for departmental review in accordance with MANMED 18-20. A revised

NAVMED Form 6100/3 is available in the supply system.

A number of changes have been made in medical board reporting requirements. Involved personnel are referred to the complete instruction for particulars.

Other sections of this instruction remain unchanged from previous versions.

BUMEDINST 6470.11A of 27 August 1975

Subj: Biological effects of electromagnetic radiation Project Office: designation of

To help define electromagnetic radiation interaction with biological systems, determine threshold levels of such interaction, and provide a sound scientific basis for acceptable standards for EMR exposure, a project office for biological effects of EMR is established within the Naval Medical Research and Development Command. CAPT Paul E. Tyler (MC) is the office director. As required, he shall establish direct liaison with other commands to coordinate the Navy's EMR research effort.

The scope, operating relationships, organization, authority, and responsibilities of the new office are specified in the charter included in this instruction.

BUMEDINST 6700.13F of 29 August 1975

Subj: Authorized Medical/Dental Allowance Lists for U.S. naval vessels, Fleet Marine Force and other elements of the operating forces; maintenance and distribution of

Drafted by the Naval Medical Material Support Command in Philadelphia, this instruction promulgates revised information concerning the distribution and use of the Authorized Medical/Dental Allowance Lists for U.S. naval vessels.

BUMEDINST 6260.19 of 5 September 1975

Subj: Mercury hygiene in dental spaces

This instruction promulgates policies, procedures, and standards for the use of mercury in dental spaces, and provides specific information on housekeeping, work practices, cleanup of mercury spills, and mercury storage. Sources of technical assistance are listed for dental activities ashore and afloat.

Dental commands, services, and departments must ensure that personnel exposure to environmental mercury levels is controlled, and that all dental personnel are aware of the hazards associated with mercury and are informed of methods to minimize these hazards.

BUMEDINST 1020.3 of 12 September 1975

Subj: Dental operating gowns

Gowns shall be worn at all times while performing dental diagnosis or treatment. Male dental officers shall wear the man's gold dental operating smock, classified by National Stock Number as: NSN 6532-01-004-3796, X-large; NSN 6532-01-005-4793, large; NSN 6532-01-005-4792, medium; and NSN 6532-01-005-4791, small. This smock may not be immediately available in the Federal Supply System. However, the smock may be locally purchased if it meets style, closure mechanism, sleeve length, and collar design criteria described for the man's aqua dental operating smock.

Female dental officers shall wear either the same man's gold dental operating smock or the optional white working pantsuit.

Male dental technicians shall wear the man's aqua dental operating smock. Female dental technicians shall wear either the man's aqua dental operating smock or the optional white working pantsuit.

No other type gowns shall be worn while performing clinical dentistry, except for officers and dental technicians who deliver oral surgical treatment in the operating room, dental prosthetic technicians functioning in prosthetic laboratories, and dental repair technicians.

BUMEDNOTE 5211 of 17 September 1975

Subj: DD Form 2005, Privacy Act Statement—Health Care Records

The Privacy Act of 1974 requires that individuals from whom personal information is requested must be informed of the authority for the request.

DD Form 2005, included in this notice, explains the purpose for all personal information requested to facilitate and document health care received at Navy medical and dental facilities.

At the time of a patient's initial visit to a Navy Department treatment facility, he or she shall be asked to read and sign DD Form 2005. The form shall be included in the individual's health record, outpatient treatment record, or clinical record, as applicable.

If the individual declines to sign DD Form 2005, a statement to this effect shall be included in the record. Treatment should be provided based on available information.

Only one DD Form 2005 shall be included in each record. The initial statement covers all subsequent forms and documentation. When records are not available, obtain a new statement and place it in a new record as a precautionary measure. A copy of DD Form 2005 shall be given to the patient.

BUMEDINST 6610.2 of 17 September 1975

Subj: Standards of service at dental contact points

Patients in Navy dental facilities shall be treated courteously, and shall be provided rapid, responsive professional care. If required to wait longer than 15 minutes, patients shall be told the reason for the delay and given an estimated time of service.

The usual 40-hour work week will normally be sufficient to meet dental care requirements; however, emergency and humanitarian care should be available after normal working hours.

The rules of mutual courtesy apply. Abuses by either patients or contact point personnel shall be referred to supervisory personnel. Patients displeased with the dental service they receive shall be given prompt access to supervisory personnel or the commanding officer to discuss areas of dissatisfaction.

A fair share of nearby parking spaces shall be provided for dental patients.

Contact personnel are to be selected, trained, and motivated to meet high standards, with the emphasis on personal service. Dental standards of service will be included in Inspector General, Dental visits and the command inspection program.

Manual of the Medical Department
Change 86 of 10 September 1975

Subj: Privacy Act; implementation of

The Surgeon General administers and supervises the execution of SECNAVINST 5211.5 (Personal privacy and rights of individuals regarding their personal records) as it pertains to the Medical Treatment Record System. The Surgeon General is also authorized to deny requests of individuals for access to and amendment of their medical and dental records. Within BUMED, the director of the Health Care Administration Division (Code 72) is Privacy Act coordinator.

COs and OICs of Navy and Marine Corps activities are designated local system managers for individual health care records maintained and serviced within their activities. Custodians of these records must be familiar with SECNAVINST 5211.5, and comply with the following general provisions:

- Individuals may know what records pertaining to them are collected, maintained, used or disseminated; may have access to and copy their record; and may obtain amendment of such records when a discrepancy is noted.
- Individuals may prevent records obtained for a particular purpose from being used for another purpose without their consent.
- Records of identifiable personal information may be collected, maintained, used, or disseminated only for necessary and lawful purposes. Information must be current and accurate for its intended use.
- Misuse of personal information from records must be prevented.
- Prompt response must be given to individual requests for notification, access, disclosure, or amendment of records. (If denied, the request and all supporting documentation shall be forwarded to BUMED Code 72.)

Upon a show of authority, local system managers may release information from health care records subject to certain provisions, and in accordance with the following policy guidelines:

- Information in health care records is exempt from release under the Freedom of Information Act and shall not be made available to the public.
- Individuals will be provided information from their personal health care records unless it might be injurious to their physical or mental health. In such cases, individuals shall be asked to authorize

release of the information to their personal physician.

- Health care information shall be released to authorized representatives of the individual concerned upon the written request of the individual or his legal representative. If the individual concerned is mentally incompetent, insane, or deceased, the next of kin or legal representative must authorize, in writing, the release of the records.
- Within the provisions set forth in this change, health care information may be released, upon request, to other departments and agencies which have a legitimate need for the information. Only information germane to the request shall be disclosed.
- Releasing authorities shall comply with lawful court orders to produce health care records. If doubt exists, a legal officer shall be consulted.
- Information from command health care records may be released to staff members conducting research. Where possible, the names of individuals should be deleted. Requests from other research groups for records shall be forwarded to BUMED.

Activities shall keep an accurate accounting of the date, nature, and purpose of each disclosure of a record, including the name and address of the person or agency to which the disclosure is made. Notice of such disclosures will be made an integral part of the individual's health care record. When compatible with the purpose for which the record is maintained, no such accounting is required for disclosures made to Department of the Navy or Department of Defense personnel who need the information to perform their duties. No such accounting is required for records released under the Freedom of Information Act.

Requests to amend health care records must be in writing, and must indicate that they are made under the Privacy Act or SECNAVINST 5211.5. They should contain enough information to identify the particular record in question and should describe the changes desired, reasons for requesting amendment, and any supporting information.

Requests for amendment should be submitted to the local systems manager who holds the records. If the request cannot be acted on within ten working days, it should be acknowledged in writing and an estimated date given when action may be completed.

If warranted, amendments shall be made in the appropriate records; however, the original entry shall not be stricken out. Local systems managers are not authorized to delete information from the records. Previous recipients of the record shall be advised of amendments.

If the request for amendment is deemed not warranted, or if the amendment would require the deletion of the record, the request shall be forwarded to BUMED Code 72.

Except in Veterans Administration cases, requests for completion of blank forms relative to deaths in naval medical facilities shall be completed locally after permission has been received from the next of kin. When VA beneficiaries are involved, requests shall be forwarded to the manager of the VA regional office authorizing admission of the patient.

Clinical records may be furnished to the Armed Forces Institute of Pathology upon request. A teaching hospital may reproduce records considered valuable for residency training, research, or clinical investigation.

When approved by the CO, medical or dental information may be released to the district legal officer for the purpose of pursuing a Medical Care Recovery Act claim, provided the records are directly related to treatment of the conditions which gave rise to the claim.

When subpoena for health care records is received, records shall be released in accordance with the instructions of the Judge Advocate General designee.

COs of Medical Department treatment facilities and Medical Department representatives shall submit the annual report required by paragraph 14 of SECNAVINST 5211.5 to BUMED Code 72 no later than 1 February of each year.

HOW TO ORDER INSTRUCTIONS AND NOTICES

If your facility does not have copies of BUMED *Instructions* described above, you may order them from: Commanding Officer, Navy Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

Copies of current BUMED Notices may be ordered from: Department of the Navy, Bureau of Medicine and Surgery (Code 0113), Washington, D.C. 20372.

U.S. NAVAL PUBLICATIONS and FORMS CENTER
ATTN: CODE 306
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END OF THE ROAD.—To celebrate the Navy's 200th birthday, 14 runners set out from NRMC Camp Lejeune, N.C., on 3 October carrying greetings and gifts to the Navy Surgeon General. Some 386 miles and three days later, 13 of them arrived at the Bureau of Medicine and Surgery, Washington, D.C. Reaching the end of the road above are: HMCSs G.A. Miller and G.A. Logsdon; HMC P.K. Clifton; HM1 A. Ybanez; HM2s R.L. Applewhite, J.E. Neal, and C.D. Reep; HM3s W. Coyle and E. Thorgenson; HNs R. Ressen and H. Weekley; and DA D. Martinez.